

REPORT ON THE CAPSIZE OF THE PASSENGER VESSEL LADY D
ADDENDUM TO THE FINAL REPORT

27 August 2004



National Transportation Safety Board
Office of Marine Safety
490 L'Enfant Plaza East, S.W.
Washington, DC 20594

Prepared Under Contract GS-23F-0068
Order No. NTSBF040020

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REPORT ON THE CAPSIZE OF THE PASSENGER VESSEL LADY D ADDENDUM TO THE FINAL REPORT

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Summary of Findings

This document is an addendum to the 26 July 2004 report delivered by JJMA to the NTSB under National Transportation Safety Board (NTSB) Order No. NTSBF040020, of Contract No. GS-23F-0068. This addendum documents the maximum safe passenger loading for the LADY D in accordance with the criteria for the simplified stability test of 46 CFR 178.340 for a pontoon vessel operating in protected waters using an average passenger weight of 140 lbs. It also documents the dynamic stability of the vessel with the maximum safe passenger load under the safe environmental conditions that caused the LADY D to capsize on March 8, 2004.

Static Stability Analysis

The static stability analysis performed on the LADY D shows that the maximum safe loading condition for the vessel is 14 passengers based on the 46 CFR 178.340 criteria for pontoon vessels operating in protected waters. The lighter load is beneficial in two ways. It decreases the heeling moment the vessel is subjected to and it increases the amount of reserve buoyancy to counteract the overturning moment. In this loading condition the vessel heeled a maximum of 5.92 degrees when all passenger weight was moved to one side. This is a reduction of heel of more than 1 degree when compared to the vessel with 16 passengers.

Dynamic Analysis

Using the wind and wave environment of March 6, 2004, the dynamic analysis of the 14-passenger loading condition showed that LADY D could capsize if the port beam is exposed to wind and waves for a substantial period of time. When the beam is exposed for 30 minutes, the 14-passenger condition capsized in 9 of 40 cases. Of cases that capsized, the average time to capsize was 12 minutes 14 seconds. The fastest time was 1 minute 29 seconds. The LADY D could complete a turn to reverse course in less than 20 seconds. The conclusion drawn from the dynamic analysis is that when loaded with 14-passengers LADY D would be unlikely to capsize when exposed to environment from the port beam while executing a normal turn to reverse course.



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1. Introduction

On 6 March 2004 the LADY D, carrying 23 passengers and 2 crewmembers, in route from Fort McHenry to Fells Point, encountered a rapidly developing storm, with high winds, and capsized in Baltimore Harbor. This incident resulted in the deaths of five individuals.

The LADY D is an aluminum pontoon boat 36 ft in length by 8 ft in beam, powered by a single 90 hp outboard motor. The vessel was built in Willow Street, Pennsylvania, and was being operated as a Seaport Taxi, serving the City of Baltimore Inner Harbor area. The vessel carried an undated Stability Letter from the U.S. Coast Guard Officer in Charge, Marine Inspection, Baltimore, MD. The letter certified that the stability of the LADY D was satisfactory for operations, under reasonable conditions, with a maximum capacity of no more than 25 people (passengers plus crew). The vessel also had a Certificate of Inspection from the USCG, dated 28 February 2002, specifying that the vessel carry no more than 25 passengers, “not more than 1,000 feet from shore under reasonable operating conditions.”

Capsizing of the LADY D, however, calls into question the applicability of current Federal regulations to vessels of this type and service. NTSB has been charged with the responsibility to investigate the facts surrounding the capsizing of the LADY D, determine the root cause of the capsizing and recommend appropriate regulatory changes to guard against future occurrences.

JJMA was awarded Order No. NTSBF040020, under Contract No. GS-23F-0068, to provide engineering services as part of the investigation into the capsizing of the LADY D. Following completion of the first four tasks under this order, a fifth task was issued to further examine issues raised in the preceding tasks. The objective of the fifth task is to: “examine the dynamic response of the vessel LADY D when loaded to its maximum safe number of passengers, as determined by applying current stability criteria under similar environmental conditions, to provide some measure of assurance that the static stability criteria provided in federal regulations is adequate.”



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2. Static Stability Analysis of LADY D

The SOW for Task 5 states: “Evaluate the intact stability of the LADY D using GHS software to verify the maximum safe passenger loading for the vessel. Static stability calculations shall be performed in accordance with the criteria for the simplified stability test of 46 CFR 178.340 for a pontoon vessel operating in protected waters using an average passenger weight of 140 lbs.” An analysis of the vessel done for the 26 July 2004 report indicated that the safe passenger load for the LADY D was less than the 16 passenger load for which the PATRICIA P was certified following her 18 March 2004 simplified stability test. When loaded with 16 passengers the LADY D failed to pass the criteria with passengers in both the extreme starboard and extreme port loading conditions.

2.1 Calculation of Maximum Safe Passenger Load

The stability analysis was performed using the same GHS model and vessel weight estimate as was used for the original calculations. The number of passengers was reduced incrementally from 16 passengers to create new a loading condition for the vessel. Then the stability analysis was run for each loading condition until a condition was found where the vessel passed the criteria. The vessel passed the criteria with a passenger load of 14 passengers weighting 140 pounds each. The summary of the load conditions for this case is shown in Figure 1. The complete results are shown in Appendix A of this addendum.

Figure 1 Loading Condition Summary for 14 CFR Passengers

Passenger Load Position	Weight (lbs)	VCG (ft)	LCG aft FP (ft)	TCG (ft)
Centered	6682	3.86	16.83	0.02 s
Extreme Starboard	6682	3.86	16.83	0.94 s
Extreme Port	6682	3.86	16.83	0.90 p
Extreme Forward	6682	3.86	13.49	0.02 s
Extreme Aft	6682	3.86	20.17	0.02 s

Note: Total weight is defined as the weight of the vessel (including fuel) plus 14 passengers at an average weight of 140 lbs each, per 46CFR 178.340.

The results of the intact stability analysis for the vessel with 14 passengers are shown in Figure 2. The criteria for adequate stability in the starboard and port load cases is that: “the remaining exposed cross sectional area of the pontoon on that side must be equal to or greater than the cross sectional area submerged due to the load shift”. This means that no more than half the initial exposed cross sectional area can be submerged due to the load shift. Column 5 of Figure 2 shows the “exposed” cross sectional area of the pontoon(s) for the centered load, and for the pontoon on the same side of the load shift for the extreme starboard and port loads. If the number in the “Exposed Area” column of Figure 2 is greater than the number in the “Required Area” column the vessel passes the criteria. As can be seen for both extreme starboard and extreme port conditions the vessel satisfies the minimum criteria for adequate stability. The



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lighter load is beneficial in two ways. It decreases the heeling moment the vessel is subjected to and it increases the amount of reserve buoyancy to counteract the overturning moment. Figure 2 shows that the LADY D experiences a maximum heel of 5.92 degrees to starboard when all passengers are shifted to the starboard side. This is a reduction of heel angle of more than 1 degree when compared to the analysis of the vessel with 16 passengers.

Figure 2 Results for 14 CFR Passenger Load

Passenger Load Position	Weight (lbs)	Draft @ FP (ft)	Equiv. Heel (degrees)	Exposed Area (ft ²)	Required Area (ft ²)	Pontoon Top Submerged
Centered	6682	0.89	0.12 s	1.32s/1.35p	n/a	No
Extreme Starboard	6682	0.87	5.92 s	0.71	0.66	No
Extreme Port	6682	0.87	5.66 p	0.74	0.68	No
Extreme Forward	6682	1.31	0.12 s	n/a	n/a	No
Extreme Aft	6682	0.43	0.13 s	n/a	n/a	No

Note: n/a – indicates that the requirement is not applicable to the particular condition.

The criterion for the forward and aft load cases is that: “the top of the pontoon must not be submerged at any location”. For the extreme forward load condition, the starboard pontoon has 0.63 feet of freeboard at the forward tip (at the top) of the pontoon. For the extreme aft load condition, the starboard pontoon has 0.39 feet of freeboard at the aft end (at the top) of the pontoon. Therefore, the vessel also meets the stability requirements for fore and aft loading of 46 CFR 178.340.



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3. Dynamic Stability Analysis of LADY D

The SOW for Task 5 states: “Using the maximum safe passenger loading established in [the previous section], JJMA will determine if the LADY D would have capsized under the same environmental conditions. JJMA will run 20 simulations, as was done in the previous analysis. The wave, wind, speed and heading determined in the previous analysis will be used. Percentage of simulations that capsized, average time to capsize, shortest and longest time to capsize, and other relevant statistics will be calculated and reported. Statistics and time series data from each simulation will be provided for further review.”

3.1 Results of Dynamic Analysis with 14 CFR Passenger Load

The dynamic analysis of the 14-passenger loading condition showed that LADY D could capsize if the wind and waves act on the port beam for a substantial period of time. For this addendum, the environmental conditions were the same as those used in the initial analysis of the LADY D carrying 25 passengers. The wave height was a 1.25 feet at a peak period of 3.0 seconds. There was a 25 knot steady wind, gusting to 42 knots. Both wind and waves were from the port beam. The vessel speed was 5 knots. All of the simulation run data, statistics and plots are in Appendix B and on the accompanying CD-ROM.

When exposed to those wind and waves for 30 minutes, capsize resulted in 9 of 40 cases. The AQWA analysis was run for a total of forty simulations rather than the twenty required by the SOW. The first twenty runs showed the vessel capsizing twice, so an additional 20 runs were performed to gather additional data for analysis. The nine capsizes is a significant reduction from the original analysis where all cases capsized within 1 minute. With the 14-passenger load, of the cases that capsized, the average time to capsize was 12 minutes 14 seconds. The fastest time was 1 minute 29 seconds. The statistics of the cases that capsized are shown in Figure 3. In the analysis 31 of the 40 cases did not capsize when exposed port beam to wind and waves for 30 minutes. Summarized results for all 40 cases are shown in Figure 4 with the capsized cases highlighted.



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Figure 3 Statistics of Cases that Capsized

Comment: 14 person load case, capsizes						
		Model = Lady D rev -				
		Speed = 5	knots			
		Heading = 30	degrees true			
		Steady Wind Speed = 25	knots			
		Gust Speed = 42	knots			
		Wind Direction = 300	degrees true			
		Wind Spectrum =Davenport				
		Significant Wave Height = 1.25	feet			
		Peak Wave Period = 3	seconds			
		Wave Direction = 300	degrees true			
		Wave Spectrum = Jonswap				
		At Capsizing Event			For Entire Simulation	
Case #	Time (sec)	Wave Amplitude (ft)	Wind Speed (kts)	Roll Angle (deg)	Max Wave Amplitude (ft)	Max Wind Speed (kts)
3	266.75	0.131	25.48	60.14	0.789	42.22
12	198.00	0.616	25.82	45.23	0.976	39.64
14	1178.75	0.827	33.06	50.31	1.005	43.36
22	502.00	-0.189	12.55	-51.69	0.924	42.27
33	1436.00	0.071	38.93	51.29	1.040	44.53
35	1435.75	0.125	25.56	58.67	0.996	46.69
38	143.00	-0.230	29.80	48.04	0.917	33.49
39	1359.25	-0.206	26.91	49.50	1.414	45.63
40	88.75	-0.146	29.04	54.93	0.688	37.03
MIN	88.75	-0.230	12.55	-51.69	0.688	33.49
AVG	734.25	0.111	27.46	40.71	0.972	41.65
MAX	1436.00	0.827	38.93	60.14	1.414	46.69
STDV	601.98	0.378	7.10	34.99	0.200	4.26



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Figure 4 Results of 40 Cases

Case #	At Maximum Roll or Capsizing Event				For Entire Simulation	
	Time (sec)	Wave Amplitude (ft)	Wind Speed (kts)	Roll Angle (deg)	Max Wave Amplitude (ft)	Max Wind Speed (kts)
1	157.50	-0.442	31.10	15.64	0.719	41.81
2	120.75	0.058	25.98	14.51	0.748	39.64
3	266.75	0.131	25.48	60.14	0.789	42.22
4	179.75	0.528	24.28	16.68	0.872	43.01
5	5.25	0.095	17.34	24.14	0.643	32.17
6	1095.00	0.536	27.29	15.92	1.209	45.44
7	1414.25	0.534	24.82	13.11	1.014	42.69
8	600.75	0.058	39.99	17.58	0.902	42.15
9	640.25	0.093	28.10	25.53	2.497	41.78
10	536.00	-0.198	16.61	17.29	0.926	44.60
11	336.50	0.183	37.81	14.75	0.956	42.89
12	198.00	0.616	25.82	45.23	0.976	39.64
13	864.50	0.426	25.97	21.90	1.151	41.56
14	1178.75	0.827	33.06	50.31	1.005	43.36
15	320.75	0.092	37.81	17.49	0.987	43.13
16	887.50	0.056	27.56	14.00	1.084	45.26
17	464.00	0.486	22.71	25.42	0.983	43.01
18	703.75	0.053	28.46	19.72	1.129	41.93
19	750.50	-0.363	28.43	17.20	1.045	40.64
20	4.00	0.054	28.91	22.97	0.749	38.21
21	574.25	-0.250	34.38	15.99	0.907	42.70
22	502.00	-0.189	12.55	-51.69	0.924	42.27
23	432.00	-0.077	24.97	20.31	0.830	40.22
24	515.75	0.444	31.53	15.43	0.886	42.81
25	152.75	0.262	35.31	18.07	0.791	41.63
26	813.25	-0.304	38.42	16.09	1.064	44.89
27	183.50	0.070	22.72	17.53	0.644	37.14
28	879.75	-0.637	25.20	15.49	1.317	43.89
29	1453.75	0.214	21.40	15.81	1.018	45.53
30	360.00	0.398	18.88	28.60	0.934	41.67
31	1455.75	0.014	31.59	18.21	0.969	46.74
32	295.75	-0.176	20.79	19.19	0.976	38.88
33	1436.00	0.071	38.93	51.29	1.040	44.53
34	607.75	-0.509	25.70	18.29	1.113	40.21
35	1435.75	0.125	25.56	58.67	0.996	46.69
36	1326.75	0.314	29.26	17.09	0.988	43.25
37	879.50	-0.410	27.49	30.12	1.246	44.88
38	143.00	-0.230	29.80	48.04	0.917	33.49
39	1359.25	-0.206	26.91	49.50	1.414	45.63
40	88.75	-0.146	29.04	54.93	0.688	37.03



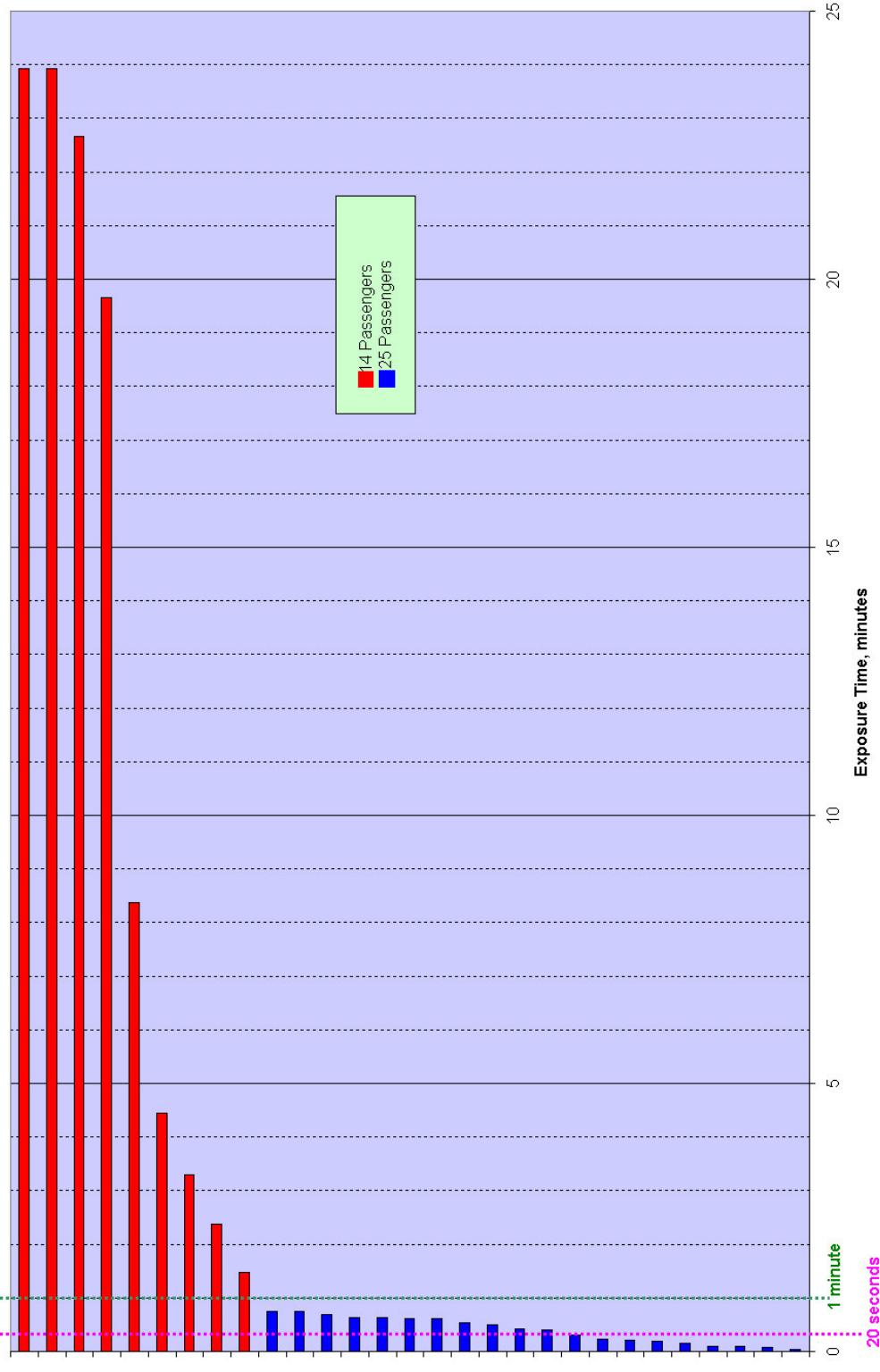
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Only the highlighted cases in Figure 4 capsized. For cases that did not capsize, the indicated time is the time of the maximum roll angle. Time is followed by the wave and wind conditions at the instant of the maximum roll. The final 2 columns in Figure 4 list the single highest peak wind and wave during that simulation. There is no correlation between the maximum roll angle and the single highest peak wind and waves. Time series plots and statistics of each case, shown at the end of this addendum, do not show correlation of maximum roll to the highest wind and waves.

As seen in Figure 5, the 14 passenger loading cases that capsized required substantially longer exposure time than the 25 passenger loading cases previously analyzed. Under the environmental conditions of that day, LADY D could have been able to reverse course, turn 180°, in under 20 seconds. If a 20 second exposure time is considered, the 14 passenger case would not capsize. If similarly exposed for 20 seconds, the 25-passenger case capsized in 9 of 20 simulations. If exposure time is placed conservatively at 1 minute, all of the 25-passenger cases capsized and still none of the 14-passenger cases capsized. A comparison of capsizes vs. exposure time is presented in Figures 6 and 7.



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Figure 6 Exposure Time to Capsize Results

Exposure Time	14-Passenger Condition	25-Passenger Condition
10 seconds	0 capsize	5 of 20 capsize / 25%
20 seconds	0 capsize	9 of 20 capsize / 45%
60 seconds	0 capsize	20 of 20 capsize / 100%
2 minutes (120 sec)	1 of 40 capsize / 2.5%	20 of 20 capsize / 100%
4 minutes (240 sec)	3 of 40 capsize / 7.5%	20 of 20 capsize / 100%
10 minutes (600 sec)	5 of 40 capsize / 12.5%	20 of 20 capsize / 100%

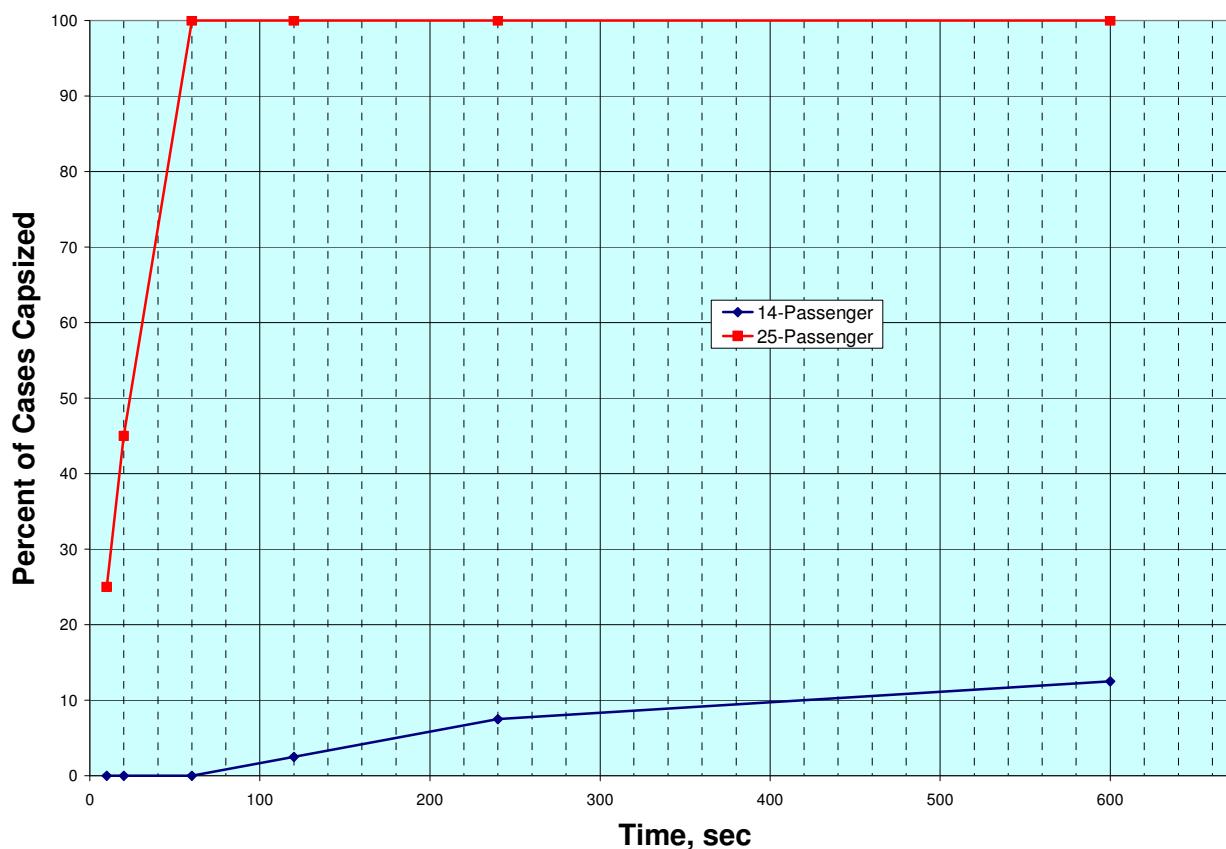


Figure 7 Exposure Time vs. Capsize



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4. Conclusions and Recommendations

The static stability analysis performed on the LADY D shows that the maximum number of passengers (including crew) the LADY D could safely carry was 14, as compared to the 25 stated on her certificate of inspection. These calculations were performed assuming an average passenger weight of 140 pounds as required by current federal regulations. The lighter load is beneficial in two ways. It decreases the heeling moment the vessel is subjected to and it increases the amount of reserve buoyancy to counteract the overturning moment.

The conclusion drawn from the dynamic analysis is that when loaded with 14-passengers the LADY D would be unlikely to capsize when exposed to environment from the port beam while executing a turn to reverse course.



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APPENDIX A

GHS Output from Static Stability Analysis

See CD-ROM "JJMA Final Report" for Electronic Files

Stability Results for LADY D with 14 CFR Passengers on Vessel Centerline

04-08-09 13:16:02 John J. McMullen & Associates, Inc. Page
1 GHS 9.00A General HydroStatics

WEIGHT and DISPLACEMENT STATUS
 Baseline draft: 0.885 @ Origin
 Trim: Aft 0.41 deg., Heel: Stbd 0.12 deg.
 Part-----Weight (LT)----LCG-----TCG-----VCG
 WEIGHT 2.98 16.83a 0.02s 3.86
 SpGr-----Displ (LT)----LCB-----TCB-----VCB-----
 RefHt
 HULL 1.000 2.98 16.85a 0.03s 0.58 -
 0.88
 -
 Righting Arms: 0.00 0.00
 Distances in FEET.

HYDROSTATIC PROPERTIES

Trim: Aft 0.41 deg., Heel: Stbd 0.12 deg., VCG = 3.86

LCF	Displacement	Buoyancy-Ctr.	Weight/	Moment/			
Draft----	Weight (LT)	LCB-----	VCB-----	Inch-----			
GMT		LCF--	Deg trim---	GML-----			
0.997	2.98	16.85a	0.58	0.32	15.80a	6.46	124.1
9.34							
Distances in FEET.-----				Specific Gravity = 1.000.-----			
LT.				Moment in Ft-			
Draft is from Baseline.							

RIGHTING ARMS vs HEEL ANGLE

Origin	Degrees of Trim	Displacement Heel	Weight (LT)	Righting Arms in Trim	Flood Pt in Heel	Height
0.885	0.40a	0.12s	2.98	0.00	0.000	0.88(1)
0.884	0.41a	1.12s	2.98	0.00	0.163s	0.82(1)
0.883	0.41a	2.12s	2.98	0.00	0.325s	0.77(1)
0.881	0.41a	3.12s	2.98	0.00	0.485s	0.71(1)
0.878	0.42a	4.12s	2.98	0.00	0.642s	0.65(1)
0.874	0.43a	5.12s	2.98	0.00	0.796s	0.60(1)
0.870	0.44a	6.12s	2.98	0.00	0.944s	0.54(1)
0.864	0.45a	7.12s	2.98	0.00	1.088s	0.48(1)
0.857	0.47a	8.12s	2.98	0.00	1.224s	0.42(1)
0.848	0.49a	9.12s	2.98	0.00	1.353s	0.36(1)
0.837	0.51a	10.12s	2.98	0.00	1.472s	0.30(1)
0.824	0.54a	11.12s	2.98	0.00	1.582s	0.23(1)
0.809	0.58a	12.12s	2.98	0.00	1.680s	0.16(1)
0.789	0.63a	13.12s	2.98	0.00	1.765s	0.09(1)
0.763	0.71a	14.12s	2.98	0.00	1.832s	0.02(1)
0.756	0.73a	14.34s	2.98	0.00	1.843s	-0.00(1)
0.723	0.83a	15.12s	2.98	0.00	1.871s	-0.07(1)
0.702	0.89a	15.48s	2.98	0.00	1.873s	-0.11(1)
0.657	1.03a	16.12s	2.98	0.00	1.866s	-0.19(1)
0.582	1.27a	17.12s	2.98	0.00	1.835s	-0.31(1)
0.504	1.52a	18.12s	2.98	0.00	1.790s	-0.44(1)
0.427	1.76a	19.12s	2.98	0.00	1.743s	-0.56(1)
0.352	1.98a	20.12s	2.98	0.00	1.696s	-0.68(1)

Distances in FEET --- Specific Gravity = 1.000 -----

Stability Results for LADY D with 14 CFR Passengers on Vessel Centerline

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+
Critical Point----- LCP----TCP----VCP
(1) top of pontoon aft      FLOOD    33.00a   3.08    2.00
.PLOT PAGE
D&T=04-08-09 13:16:02
PAG= 2
P&V=GHS 9.00A
TIT=General HydroStatics
CAT=
UNT=FT LT CU.FT
ORV=Baseline
SPG= 1 STD
WAV= 0
FWT= 2.98
FCG= 16.83 .02 3.86
GMT= 9.342796 .1215573
ARU=DEG
RAS= 23
DEP TRM HEL DWT RAT RAH HFP NFP
.8850303 .4045909 .1215573 2.979799 -3.149148E-03 -1.778891E-04 .875349
1
.8843188 .4071778 1.121557 2.98004 -6.73074E-06 .1626642 .820388 1
.8829611 .40955 2.121557 2.980007 2.669577E-04 .3247311 .7656062 1
.8810241 .4133504 3.121557 2.980017 -2.007007E-06 .4848008 .7100069 1
.8781916 .4191225 4.121557 2.980041 -5.176774E-06 .6420807 .6536099 1
.8744711 .4268159 5.121557 2.98008 -6.198122E-06 .7955834 .5964538 1
.86972 .4369053 6.121558 2.980117 2.275709E-05 .9443455 .5384251 1
.8638833 .4495879 7.121557 2.980192 -8.677747E-06 1.087573 .4794823 1
.8566428 .4658288 8.121557 2.980307 -3.647169E-05 1.223902 .4194053 1
.8479776 .4857574 9.121557 2.980376 1.042697E-04 1.352663 .3581579 1
.837382 .5110385 10.12156 2.980564 5.247827E-08 1.472352 .2953048 1
.8243783 .5431127 11.12156 2.980793 -1.330183E-04 1.581602 .2305114 1
.8085136 .582778 12.12156 2.980003 1.168391E-05 1.680289 .1637889 1
.7887087 .6344477 13.12156 2.979204 -1.385268E-04 1.765409 9.369218E-02
1
.762958 .7069056 14.12156 2.97999 -8.981532E-04 1.83174 1.718408E-02 1
.755936 .7276405 14.33631 2.980298 -6.432665E-06 1.842847 -7.835031E-04
1
.7230057 .8255813 15.12156 2.980024 -2.55821E-03 1.871062 -.0721131 1
.7019019 .8926645 15.48358 2.980657 -1.398997E-03 1.873417 -.1117836 1
.6573762 1.033213 16.12156 2.979998 1.327158E-03 1.866322 -.1873308 1
.5819353 1.274545 17.12156 2.980162 4.466369E-04 1.83466 -.3124786 1
.5036044 1.52346 18.12156 2.980102 8.22766E-04 1.790337 -.4394042 1
.4270178 1.759453 19.12156 2.980217 5.217015E-04 1.743377 -.5609027 1
.3521163 1.981116 20.12156 2.980252 4.711887E-04 1.696154 -.6760808 1
.END PLOT

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Stability Results for LADY D with 14 CFR Passengers on Vessel Centerline

04-08-09 13:16:02 John J. McMullen & Associates, Inc. Page
3
GHS 9.00A General HydroStatics

Part: HULL Component: PPONTOON.C Side: CL Effectiveness:
1.000
Origin Depth: 0.885
Trim: Aft 0.41 deg. Heel: Stbd 0.12 deg.

PPONTOON.C COMPONENT SECTIONS

Section Location	Baseline Depth	Area	Sect i on TCtr	VCtr	Waterline Width	Ctr
2.90f	0.86					
2.72f	0.87	0.00	3.08p	0.86	0.09	-3.08
2.65f	0.87	0.03	3.08p	0.73	0.14	-3.08
2.00f	0.87	0.19	3.08p	0.68	0.60	-3.08
1.00f	0.88	0.60	3.08p	0.61	1.29	-3.08
0.00	0.88	1.33	3.08p	0.51	1.98	-3.08
1.32a	0.89	1.35	3.08p	0.51	1.98	-3.08
2.64a	0.90	1.36	3.08p	0.52	1.99	-3.08
3.96a	0.91	1.38	3.08p	0.52	1.99	-3.08
5.28a	0.92	1.40	3.08p	0.53	1.99	-3.08
6.60a	0.93	1.42	3.08p	0.53	1.99	-3.08
7.92a	0.94	1.44	3.08p	0.54	1.99	-3.08
9.24a	0.95	1.46	3.08p	0.54	2.00	-3.08
10.56a	0.96	1.48	3.08p	0.55	2.00	-3.08
11.88a	0.97	1.49	3.08p	0.56	2.00	-3.08
13.20a	0.98	1.51	3.08p	0.56	2.00	-3.08
14.52a	0.99	1.53	3.08p	0.57	2.00	-3.08
15.84a	1.00	1.55	3.08p	0.57	2.00	-3.08
17.16a	1.01	1.57	3.08p	0.58	2.01	-3.08
18.48a	1.02	1.59	3.08p	0.58	2.00	-3.08
19.80a	1.02	1.61	3.08p	0.59	2.00	-3.08
21.12a	1.03	1.63	3.08p	0.59	2.00	-3.08
22.44a	1.04	1.64	3.08p	0.60	2.00	-3.08
23.76a	1.05	1.66	3.08p	0.60	2.00	-3.08
25.08a	1.06	1.68	3.08p	0.61	2.00	-3.08
26.40a	1.07	1.70	3.08p	0.61	1.99	-3.08
27.72a	1.08	1.72	3.08p	0.62	1.99	-3.08
29.04a	1.09	1.74	3.08p	0.62	1.99	-3.08
30.36a	1.10	1.76	3.08p	0.63	1.99	-3.08
31.68a	1.11	1.78	3.08p	0.63	1.99	-3.08
33.00a	1.12	1.79	3.08p	0.64	1.98	-3.08

Distances in FEET.-----

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TRM= .4061352
SAC= 30

Stability Results for LADY D with 14 CFR Passengers on Vessel Centerline

LOC	BLD	ARA	TCA	VCA
-2.720258	.8653451	0	-3.082691	.8588068
-2.65	.8658432	3.257231E-02	-3.082986	.7257154
-2	.8704507	.1862668	-3.082799	.6840174
-1	.8775392	.598219	-3.082368	.6083775
0	.8846277	1.327343	-3.081962	.5090678
1.32	.8939846	1.3459	-3.081974	.5142205
2.64	.9033414	1.364475	-3.081985	.5193648
3.96	.9126982	1.383066	-3.081996	.5245012
5.28	.9220551	1.401674	-3.082006	.5296301
6.6	.9314119	1.420299	-3.082017	.5347517
7.92	.9407688	1.438941	-3.082027	.5398666
9.24	.9501256	1.4576	-3.082037	.5449747
10.56	.9594824	1.476276	-3.082046	.5500768
11.88	.9688393	1.494969	-3.082056	.5551727
13.2	.9781961	1.513679	-3.082065	.5602628
14.52	.987553	1.532406	-3.082074	.5653476
15.84	.9969098	1.55115	-3.082083	.5704269
17.16	1.006267	1.569911	-3.082091	.5755013
18.48	1.015623	1.588672	-3.082104	.5805664
19.8	1.02498	1.607417	-3.082117	.5856181
21.12	1.034337	1.626145	-3.082129	.5906566
22.44	1.043694	1.644856	-3.082142	.5956826
23.76	1.053051	1.66355	-3.082154	.6006961
25.08	1.062408	1.682227	-3.082165	.6056979
26.4	1.071765	1.700887	-3.082177	.6106879
27.72	1.081121	1.71953	-3.082188	.6156667
29.04	1.090478	1.738156	-3.082199	.6206346
30.36	1.099835	1.756765	-3.082209	.6255919
31.68	1.109192	1.775357	-3.08222	.6305386
33	1.118549	1.793932	-3.08223	.6354756

.END PLOT

Stability Results for LADY D with 14 CFR Passengers on Vessel Centerline

04-08-09 13:16:02 John J. McMullen & Associates, Inc. Page
5
GHS 9.00A General HydroStatics

Part: HULL Component: SPONTOON.C Side: CL Effectiveness:
1.000
Origin Depth: 0.885
Trim: Aft 0.41 deg. Heel: Stbd 0.12 deg.

SPONTOON.C COMPONENT SECTIONS

Section Location	Baseline Depth	Area	Sect i on TCtr	VCtr	Waterline Width	Ctr
2.90f	0.86					
2.72f	0.87	0.00	3.08s	0.87	0.09	3.09
2.65f	0.87	0.03	3.08s	0.73	0.14	3.08
2.00f	0.87	0.19	3.08s	0.69	0.60	3.08
1.00f	0.88	0.62	3.08s	0.62	1.29	3.09
0.00	0.88	1.35	3.08s	0.52	1.98	3.09
1.32a	0.89	1.37	3.08s	0.52	1.99	3.09
2.64a	0.90	1.39	3.08s	0.53	1.99	3.09
3.96a	0.91	1.41	3.08s	0.53	1.99	3.09
5.28a	0.92	1.43	3.08s	0.54	1.99	3.09
6.60a	0.93	1.45	3.08s	0.54	1.99	3.09
7.92a	0.94	1.47	3.08s	0.55	2.00	3.09
9.24a	0.95	1.48	3.08s	0.55	2.00	3.09
10.56a	0.96	1.50	3.08s	0.56	2.00	3.09
11.88a	0.97	1.52	3.08s	0.56	2.00	3.09
13.20a	0.98	1.54	3.08s	0.57	2.00	3.09
14.52a	0.99	1.56	3.08s	0.57	2.00	3.09
15.84a	1.00	1.58	3.08s	0.58	2.01	3.08
17.16a	1.01	1.60	3.08s	0.58	2.00	3.08
18.48a	1.02	1.61	3.08s	0.59	2.00	3.08
19.80a	1.02	1.63	3.08s	0.59	2.00	3.08
21.12a	1.03	1.65	3.08s	0.60	2.00	3.08
22.44a	1.04	1.67	3.08s	0.60	2.00	3.09
23.76a	1.05	1.69	3.08s	0.61	1.99	3.09
25.08a	1.06	1.71	3.08s	0.61	1.99	3.09
26.40a	1.07	1.73	3.08s	0.62	1.99	3.09
27.72a	1.08	1.75	3.08s	0.62	1.99	3.09
29.04a	1.09	1.76	3.08s	0.63	1.99	3.09
30.36a	1.10	1.78	3.08s	0.63	1.99	3.09
31.68a	1.11	1.80	3.08s	0.64	1.98	3.09
33.00a	1.12	1.82	3.08s	0.64	1.98	3.09

Distances in FEET.-----

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CMP=SPONTOON.C
HEL= .1215573
TRM= .4061352
SAC= 30

Stability Results for LADY D with 14 CFR Passengers on Vessel Centerline

LOC	BLD	ARA	TCA	VCA
-2.723049	.8653253	0	3.083315	.8718687
-2.65	.8658432	3.438459E-02	3.083014	.7331018
-2	.8704507	.1940968	3.083198	.6915387
-1	.8775392	.6151077	3.083622	.6157678
0	.8846277	1.353292	3.084022	.5162693
1.32	.8939846	1.371873	3.08401	.5214103
2.64	.9033414	1.390471	3.084	.5265437
3.96	.9126982	1.409086	3.083989	.5316697
5.28	.9220551	1.427718	3.083979	.5367887
6.6	.9314119	1.446367	3.083969	.5419009
7.92	.9407688	1.465033	3.083959	.5470065
9.24	.9501256	1.483715	3.08395	.552106
10.56	.9594824	1.502415	3.083941	.5571997
11.88	.9688393	1.521132	3.083932	.5622876
13.2	.9781961	1.539866	3.083923	.5673702
14.52	.987553	1.558616	3.083914	.5724475
15.84	.9969098	1.577381	3.083904	.5775191
17.16	1.006267	1.596136	3.083891	.5825789
18.48	1.015623	1.614874	3.083878	.5876253
19.8	1.02498	1.633595	3.083866	.5926588
21.12	1.034337	1.652299	3.083853	.5976798
22.44	1.043694	1.670987	3.083842	.6026886
23.76	1.053051	1.689657	3.08383	.6076856
25.08	1.062408	1.70831	3.083819	.6126711
26.4	1.071765	1.726946	3.083808	.6176456
27.72	1.081121	1.745566	3.083797	.6226092
29.04	1.090478	1.764168	3.083786	.6275622
30.36	1.099835	1.782754	3.083776	.6325052
31.68	1.109192	1.801322	3.083766	.6374381
33	1.118549	1.819873	3.083756	.6423614

.END PLOT

Stability Results for LADY D with 14 CFR Passengers on Starboard Side

04-08-09 13:16:24 John J. McMullen & Associates, Inc. Page
 1
 GHS 9.00A General HydroStatics

WEIGHT and DISPLACEMENT STATUS
 Baseline draft: 0.876 @ Origin
 Trim: Aft 0.43 deg., Heel: Stbd 5.92 deg.
 Part-----Weight (LT) ---LCG----TCG----VCG
 WEIGHT 2.98 16.83a 0.94s 3.86
 SpGr-----Displ (LT) ---LCB----TCB----VCB-----
 RefHt
 HULL 1.000 2.98 16.85a 1.27s 0.64 -
 0.87

 - Righting Arms: 0.00 0.00s
 Distances in FEET.-----
 -

HYDROSTATIC PROPERTIES
 Trim: Aft 0.43 deg., Heel: Stbd 5.92 deg., VCG = 3.86
 LCF Displacement Buoyancy-Ctr. Weight/ Moment/
 Draft---Weight (LT) ---LCB----VCB----Inch----LCF--Deg trim---GML-----
 GMT
 0.996 2.98 16.85a 0.64 0.30 15.83a 6.07 116.7
 8.54
 Distances in FEET.-----Specific Gravity = 1.000.-----Moment in Ft-
 LT.
 Draft is from Baseline.

RIGHTING ARMS vs HEEL ANGLE
 LCG = 16.83a TCG = 0.94s VCG = 3.86

Origin	Degrees of	Displacement	Righting Arms	Flood Pt
Depth---Trim---Heel---Weight (LT) ---in Trim--in Heel	--Height			
0.871 0.44a 5.92s	2.98 0.00 0.000s	0.55(1)		
0.865 0.45a 6.92s	2.98 0.00 0.146s	0.49(1)		
0.858 0.46a 7.92s	2.98 0.00 0.286s	0.43(1)		
0.850 0.48a 8.92s	2.98 0.00 0.419s	0.37(1)		
0.840 0.50a 9.92s	2.98 0.00 0.543s	0.31(1)		
0.827 0.54a 10.92s	2.98 0.00 0.658s	0.24(1)		
0.812 0.57a 11.92s	2.98 0.00 0.762s	0.18(1)		
0.793 0.62a 12.92s	2.98 0.00 0.853s	0.11(1)		
0.769 0.69a 13.92s	2.98 0.00 0.927s	0.03(1)		
0.758 0.72a 14.32s	2.98 0.00 0.951s	0.00(1)		
0.734 0.79a 14.92s	2.98 0.00 0.978s	-0.05(1)		
0.690 0.93a 15.67s	2.98 0.00 0.988s	-0.13(1)		
0.673 0.98a 15.92s	2.98 0.00 0.987s	-0.16(1)		
0.599 1.22a 16.92s	2.98 0.00 0.964s	-0.28(1)		
0.522 1.47a 17.92s	2.98 0.00 0.926s	-0.41(1)		
0.444 1.71a 18.92s	2.98 0.00 0.884s	-0.53(1)		
0.370 1.93a 19.92s	2.98 0.00 0.843s	-0.65(1)		
0.296 2.14a 20.92s	2.98 0.00 0.802s	-0.76(1)		
0.224 2.33a 21.92s	2.98 0.00 0.761s	-0.86(1)		
0.153 2.52a 22.92s	2.98 0.00 0.720s	-0.96(1)		
0.084 2.69a 23.92s	2.98 0.00 0.678s	-1.06(1)		
0.014 2.86a 24.92s	2.98 0.00 0.636s	-1.15(1)		
-0.055 3.02a 25.92s	2.98 0.00 0.592s	-1.24(1)		
Distances in FEET.---Specific Gravity = 1.000.-----				

Stability Results for LADY D with 14 CFR Passengers on Starboard Side

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+
Critical Point----- LCP----TCP----VCP
(1) top of pontoon aft      FLOOD    33.00a   3.08    2.00
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.8121841 .5728969 11.92125 2.979932 3.561225E-05 .7616338 .1778088 1
.7934827 .621224 12.92125 2.979216 -8.334252E-05 .8532083 .1086128 1
.7694443 .6880882 13.92125 2.979993 -7.075495E-04 .9273013 3.368992E-02
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.7575397 .7227111 14.31892 2.980565 -1.180763E-03 .9507833 1.509845E-03
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.6904815 .9276776 15.67125 2.98025 -1.150222E-05 .988063 -.1320225 1
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.444353 1.705763 18.92125 2.980242 2.863982E-03 .8844237 -.5348412 1
.3697858 1.928036 19.92125 2.980348 2.41732E-03 .8429486 -.6506566 1
.2963168 2.13673 20.92125 2.97993 2.315247E-03 .8020049 -.7599803 1
.2243502 2.33297 21.92125 2.979805 2.025551E-03 .7610942 -.8638436 1
.153201 2.517689 22.92125 2.979407 2.013622E-03 .7202486 -.9620783 1
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1
1.384506E-02 2.860034 24.92125 2.979362 1.721347E-03 .6362132 -1.146378
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Stability Results for LADY D with 14 CFR Passengers on Starboard Side

04-08-09 13:16:24 John J. McMullen & Associates, Inc. Page
3 GHS 9.00A General HydroStatics

Part: HULL Component: PPONTOON.C Side: CL Effectiveness:
1.000
Origin Depth: 0.871
Trim: Aft 0.43 deg. Heel: Stbd 5.92 deg.

PPONTOON.C COMPONENT SECTIONS

Section	Baseline	Section			Waterline	
Location	Depth	Area	TCTr	VCTr	Width	Ctr
2.90f	0.85					
2.65f	0.85	0.00	3.08p	0.54	0.00	-3.01
2.65f	0.85	0.00	3.08p	0.53	0.00	-3.01
2.00f	0.86	0.03	3.07p	0.49	0.33	-3.00
1.00f	0.86	0.22	3.04p	0.42	1.02	-2.98
0.00	0.87	0.72	3.01p	0.33	1.80	-2.96
1.32a	0.88	0.73	3.01p	0.34	1.80	-2.96
2.64a	0.89	0.75	3.01p	0.34	1.81	-2.96
3.96a	0.90	0.77	3.02p	0.35	1.82	-2.96
5.28a	0.91	0.79	3.02p	0.36	1.83	-2.96
6.60a	0.92	0.81	3.02p	0.36	1.84	-2.96
7.92a	0.93	0.83	3.02p	0.37	1.85	-2.96
9.24a	0.94	0.84	3.02p	0.37	1.85	-2.96
10.56a	0.95	0.86	3.02p	0.38	1.86	-2.96
11.88a	0.96	0.88	3.02p	0.38	1.87	-2.96
13.20a	0.97	0.90	3.02p	0.39	1.88	-2.96
14.52a	0.98	0.92	3.02p	0.39	1.89	-2.96
15.84a	0.99	0.94	3.02p	0.40	1.90	-2.96
17.16a	1.00	0.96	3.02p	0.41	1.90	-2.96
18.48a	1.01	0.98	3.02p	0.41	1.91	-2.96
19.80a	1.02	1.00	3.02p	0.42	1.92	-2.96
21.12a	1.03	1.01	3.02p	0.42	1.92	-2.96
22.44a	1.04	1.03	3.02p	0.43	1.93	-2.96
23.76a	1.05	1.05	3.02p	0.43	1.93	-2.96
25.08a	1.06	1.07	3.02p	0.44	1.94	-2.96
26.40a	1.07	1.09	3.03p	0.45	1.94	-2.96
27.72a	1.08	1.11	3.03p	0.45	1.94	-2.96
29.04a	1.09	1.13	3.03p	0.46	1.95	-2.96
30.36a	1.10	1.15	3.03p	0.46	1.95	-2.96
31.68a	1.11	1.17	3.03p	0.47	1.96	-2.96
33.00a	1.12	1.19	3.03p	0.47	1.96	-2.96

Distances in FEET.-----

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ORV=Baseline
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WAV= 0
PRT=HULL
CMP=PPONTOON.C
HEL= 5.921253
TRM= .4339697
SAC= 30

Stability Results for LADY D with 14 CFR Passengers on Starboard Side

LOC	BLD	ARA	TCA	VCA
-2.651238	.850983	0	-3.082407	.5358562
-2.65	.8509924	0	-3.082702	.532933
-2	.8559158	2.790146E-02	-3.07223	.489796
-1	.8634901	.2195489	-3.041658	.4232811
0	.8710644	.7168788	-3.013701	.3322525
1.32	.8810626	.7348709	-3.014298	.3379674
2.64	.8910607	.7529458	-3.014893	.3436725
3.96	.9010588	.7711039	-3.015485	.3493687
5.28	.911057	.7893451	-3.016076	.3550571
6.6	.9210551	.8076692	-3.016664	.3607384
7.92	.9310533	.8260766	-3.017251	.3664135
9.24	.9410514	.8445669	-3.017837	.3720829
10.56	.9510496	.8631405	-3.018421	.3777473
11.88	.9610476	.881797	-3.019004	.3834074
13.2	.9710459	.9005367	-3.019586	.3890636
14.52	.9810439	.9193593	-3.020166	.3947164
15.84	.9910421	.9382652	-3.020746	.4003664
17.16	1.00104	.9572539	-3.021324	.4060139
18.48	1.011038	.9763258	-3.021902	.4116594
19.8	1.021037	.9954784	-3.022481	.4173022
21.12	1.031035	1.014693	-3.023074	.422936
22.44	1.041033	1.03395	-3.023668	.4285571
23.76	1.051031	1.053247	-3.024259	.4341661
25.08	1.061029	1.072583	-3.024848	.4397633
26.4	1.071027	1.091959	-3.025434	.4453498
27.72	1.081025	1.111374	-3.026019	.4509262
29.04	1.091023	1.130829	-3.026602	.4564929
30.36	1.101022	1.150324	-3.027182	.4620508
31.68	1.11102	1.169858	-3.027761	.4676004
33	1.121018	1.189433	-3.028338	.473142

.END PLOT

Stability Results for LADY D with 14 CFR Passengers on Starboard Side

04-08-09 13:16:24 John J. McMullen & Associates, Inc. Page
5
GHS 9.00A General HydroStatics

Part: HULL Component: SPONTOON.C Side: CL Effectiveness:
1.000
Origin Depth: 0.871
Trim: Aft 0.43 deg. Heel: Stbd 5.92 deg.

SPONTOON.C COMPONENT SECTIONS

Section	Baseline	Section			Waterline	
Location	Depth	Area	TCtr	VCtr	Width	Ctr
2.90f	0.85					
2.79f	0.85	0.00	3.10s	1.18	0.03	3.22
2.65f	0.85	0.08	3.08s	0.91	0.18	3.19
2.00f	0.86	0.39	3.09s	0.86	0.64	3.19
1.00f	0.86	1.02	3.10s	0.78	1.35	3.19
0.00	0.87	1.96	3.12s	0.68	1.96	3.17
1.32a	0.88	1.98	3.12s	0.69	1.95	3.17
2.64a	0.89	2.00	3.12s	0.69	1.95	3.17
3.96a	0.90	2.02	3.11s	0.70	1.95	3.17
5.28a	0.91	2.03	3.11s	0.70	1.94	3.17
6.60a	0.92	2.05	3.11s	0.71	1.94	3.17
7.92a	0.93	2.07	3.11s	0.71	1.93	3.17
9.24a	0.94	2.09	3.11s	0.72	1.93	3.17
10.56a	0.95	2.11	3.11s	0.72	1.93	3.17
11.88a	0.96	2.13	3.11s	0.73	1.92	3.17
13.20a	0.97	2.15	3.11s	0.73	1.92	3.17
14.52a	0.98	2.17	3.11s	0.74	1.91	3.17
15.84a	0.99	2.19	3.11s	0.74	1.90	3.17
17.16a	1.00	2.21	3.11s	0.75	1.89	3.17
18.48a	1.01	2.23	3.11s	0.75	1.88	3.17
19.80a	1.02	2.25	3.11s	0.76	1.88	3.17
21.12a	1.03	2.26	3.11s	0.76	1.87	3.17
22.44a	1.04	2.28	3.11s	0.77	1.86	3.17
23.76a	1.05	2.30	3.11s	0.77	1.85	3.17
25.08a	1.06	2.32	3.11s	0.78	1.84	3.17
26.40a	1.07	2.34	3.11s	0.78	1.83	3.17
27.72a	1.08	2.36	3.11s	0.78	1.83	3.17
29.04a	1.09	2.37	3.10s	0.79	1.82	3.17
30.36a	1.10	2.39	3.10s	0.79	1.81	3.17
31.68a	1.11	2.41	3.10s	0.80	1.80	3.17
33.00a	1.12	2.43	3.10s	0.80	1.79	3.17

Distances in FEET.-----

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HEL= 5.921253
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SAC= 30

Stability Results for LADY D with 14 CFR Passengers on Starboard Side

LOC	BLD	ARA	TCA	VCA
-2.787663	.8499497	0	3.100692	1.176097
-2.65	.8509923	8.339891E-02	3.083615	.907776
-2	.8559157	.3857662	3.088873	.8600207
-1	.86349	1.019499	3.103396	.7838027
0	.8710644	1.956873	3.11617	.6802929
1.32	.8810625	1.976436	3.115639	.6854212
2.64	.8910607	1.99596	3.115111	.6905361
3.96	.9010588	2.015443	3.114583	.6956381
5.28	.9110569	2.034887	3.114058	.7007274
6.6	.9210551	2.054292	3.113534	.7058042
7.92	.9310532	2.073657	3.113012	.7108688
9.24	.9410514	2.092983	3.112492	.7159217
10.56	.9510494	2.112268	3.111973	.7209626
11.88	.9610476	2.131515	3.111456	.7259923
13.2	.9710457	2.150714	3.110937	.7310086
14.52	.9810439	2.169846	3.110414	.7360058
15.84	.991042	2.188895	3.109894	.7409812
17.16	1.00104	2.207861	3.109376	.7459351
18.48	1.011038	2.226744	3.108861	.7508678
19.8	1.021037	2.245544	3.108349	.7557798
21.12	1.031035	2.26426	3.107839	.7606712
22.44	1.041033	2.282894	3.107332	.7655424
23.76	1.051031	2.301445	3.106827	.7703938
25.08	1.061029	2.319912	3.106325	.7752256
26.4	1.071027	2.338297	3.105825	.7800381
27.72	1.081025	2.356598	3.105327	.7848315
29.04	1.091023	2.374816	3.104832	.7896061
30.36	1.101022	2.392951	3.104339	.7943622
31.68	1.11102	2.411003	3.103848	.7990999
33	1.121018	2.428972	3.10336	.8038195

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Stability Results for LADY D with 14 CFR Passengers on Port Side

04-08-09 13:16:46 John J. McMullen & Associates, Inc. Page
 1
 GHS 9.00A General HydroStatics

WEIGHT and DISPLACEMENT STATUS
 Baseline draft: 0.877 @ Origin
 Trim: Aft 0.43 deg., Heel: Port 5.66 deg.

Part-----	Weight (LT) ---	LCG----	TCG----	VCG	
WEIGHT	2.98	16.83a	0.90p	3.86	
	SpGr-----	Displ (LT) ---	LCB----	TCB----	VCB-----

RefHt
 HULL 1.000 2.98 16.85a 1.22p 0.64 -
 0.87

 - Righting Arms: 0.00 0.00p
 Distances in FEET.-----
 -

HYDROSTATIC PROPERTIES
 Trim: Aft 0.43 deg., Heel: Port 5.66 deg., VCG = 3.86

LCF	Displacement	Buoyancy-Ctr.	Weight/	Moment/
Draft---	Weight (LT) ---	LCB----	VCB----	Inch----LCF--Deg trim---GML-----

GMT
 0.996 2.98 16.85a 0.64 0.30 15.83a 6.10 117.3
 8.61
 Distances in FEET.-----Specific Gravity = 1.000.-----Moment in Ft-
 LT.
 Draft is from Baseline.

RIGHTING ARMS vs HEEL ANGLE
 LCG = 16.83a TCG = 0.90p VCG = 3.86

Origin	Degrees of	Displacement	Righting Arms	Flood Pt
Depth---Trim---	Heel---	Weight (LT) ---in Trim--in Heel	--Height	
0.872	0.43a	5.66p	2.98	0.00 0.000p 0.57(1)
0.867	0.44a	6.66p	2.98	0.00 0.148p 0.51(1)
0.860	0.46a	7.66p	2.98	0.00 0.289p 0.45(1)
0.852	0.48a	8.66p	2.98	0.00 0.424p 0.39(1)
0.843	0.50a	9.66p	2.98	0.00 0.550p 0.33(1)
0.831	0.53a	10.66p	2.98	0.00 0.667p 0.26(1)
0.816	0.56a	11.66p	2.98	0.00 0.774p 0.20(1)
0.799	0.61a	12.66p	2.98	0.00 0.869p 0.13(1)
0.776	0.67a	13.66p	2.98	0.00 0.949p 0.05(1)
0.757	0.72a	14.33p	2.98	0.00 0.990p 0.00(1)
0.745	0.76a	14.66p	2.98	0.00 1.006p -0.03(1)
0.691	0.92a	15.66p	2.98	0.00 1.027p -0.13(1)
0.620	1.15a	16.66p	2.98	0.00 1.010p -0.25(1)
0.542	1.40a	17.66p	2.98	0.00 0.975p -0.38(1)
0.463	1.65a	18.66p	2.98	0.00 0.932p -0.50(1)
0.388	1.88a	19.66p	2.98	0.00 0.890p -0.62(1)
0.315	2.09a	20.66p	2.98	0.00 0.848p -0.73(1)
0.243	2.29a	21.66p	2.98	0.00 0.808p -0.84(1)
0.172	2.47a	22.66p	2.98	0.00 0.768p -0.94(1)
0.102	2.64a	23.66p	2.98	0.00 0.727p -1.03(1)
0.033	2.81a	24.66p	2.98	0.00 0.686p -1.12(1)
-0.036	2.96a	25.66p	2.98	0.00 0.643p -1.20(1)

Distances in FEET.---Specific Gravity = 1.000.-----
 +

Stability Results for LADY D with 14 CFR Passengers on Port Side

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          Critical Point----- LCP----TCP----VCP
          (1) top of pontoon aft           FLOOD   33.00a   3.08    2.00
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FCG= 16.83 -.9 3.86
GMT= 8.612226 -5.655192
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.8668877 .442873 -6.655192  2.98003 -7.106458E-06 -.1475073  .5072117  1
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.619574 1.153382 -16.65519  2.980112  3.990419E-04 -1.010106 -.2515675  1
.5423005 1.400184 -17.65519  2.98019  4.669656E-04 -.9750879 -.3781967  1
.4634324 1.648263 -18.65519  2.979654  3.283111E-03 -.9321938 -.5042531  1
.3882618 1.876375 -19.65519  2.979919  2.859958E-03 -.8896047 -.6227636  1
.3149817 2.088053 -20.65519  2.980135  2.402211E-03 -.8481715 -.7339348  1
.2429924 2.285402 -21.65519  2.980157  2.123832E-03 -.8075939 -.8383597  1
.1720489 2.469571 -22.65519  2.979933  1.893153E-03 -.7675009 -.9364347  1
.1019283 2.642524 -23.65519  2.979702  1.614195E-03 -.7272218 -1.029049  1
3.308947E-02 2.807061 -24.65519  2.980101  1.302346E-03 -.6856429 -1.118256
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1
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Stability Results for LADY D with 14 CFR Passengers on Port Side

04-08-09 13:16:46 John J. McMullen & Associates, Inc. Page
3
GHS 9.00A General HydroStatics

Part: HULL Component: PPONTOON.C Side: CL Effectiveness:
1.000
Origin Depth: 0.872
Trim: Aft 0.43 deg. Heel: Port 5.66 deg.

PPONTOON.C COMPONENT SECTIONS

Section	Baseline	Section			Waterline	
Location	Depth	Area	TCTr	VCTr	Width	Ctr
2.90f	0.85					
2.78f	0.85	0.00	3.10p	1.16	0.03	-3.21
2.65f	0.85	0.08	3.08p	0.90	0.18	-3.18
2.00f	0.86	0.38	3.09p	0.85	0.64	-3.18
1.00f	0.86	1.00	3.10p	0.78	1.35	-3.18
0.00	0.87	1.93	3.12p	0.67	1.96	-3.17
1.32a	0.88	1.95	3.11p	0.68	1.96	-3.17
2.64a	0.89	1.97	3.11p	0.68	1.96	-3.17
3.96a	0.90	1.99	3.11p	0.69	1.95	-3.17
5.28a	0.91	2.01	3.11p	0.69	1.95	-3.17
6.60a	0.92	2.03	3.11p	0.70	1.94	-3.17
7.92a	0.93	2.05	3.11p	0.70	1.94	-3.17
9.24a	0.94	2.07	3.11p	0.71	1.94	-3.17
10.56a	0.95	2.09	3.11p	0.71	1.93	-3.17
11.88a	0.96	2.10	3.11p	0.72	1.93	-3.17
13.20a	0.97	2.12	3.11p	0.72	1.92	-3.17
14.52a	0.98	2.14	3.11p	0.73	1.92	-3.17
15.84a	0.99	2.16	3.11p	0.73	1.91	-3.17
17.16a	1.00	2.18	3.11p	0.74	1.90	-3.17
18.48a	1.01	2.20	3.11p	0.74	1.90	-3.17
19.80a	1.02	2.22	3.11p	0.75	1.89	-3.17
21.12a	1.03	2.24	3.11p	0.75	1.88	-3.17
22.44a	1.04	2.26	3.11p	0.76	1.87	-3.17
23.76a	1.05	2.27	3.11p	0.76	1.86	-3.17
25.08a	1.06	2.29	3.11p	0.77	1.86	-3.17
26.40a	1.07	2.31	3.11p	0.77	1.85	-3.17
27.72a	1.08	2.33	3.11p	0.78	1.84	-3.17
29.04a	1.09	2.35	3.10p	0.78	1.83	-3.17
30.36a	1.10	2.37	3.10p	0.79	1.82	-3.17
31.68a	1.11	2.38	3.10p	0.79	1.81	-3.17
33.00a	1.12	2.40	3.10p	0.80	1.81	-3.17

Distances in FEET.-----

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Stability Results for LADY D with 14 CFR Passengers on Port Side

LOC	BLD	ARA	TCA	VCA
-2.784796	.8513891	0	-3.099987	1.162525
-2.65	.8524036	8.097463E-02	-3.083589	.8999628
-2	.8572959	.377138	-3.088736	.8528212
-1	.8648223	1.001368	-3.102828	.7765136
0	.8723488	1.930537	-3.115375	.6732311
1.32	.8822838	1.950029	-3.114869	.6783476
2.64	.8922187	1.969482	-3.114365	.6834506
3.96	.9021536	1.988896	-3.113862	.6885401
5.28	.9120886	2.008271	-3.11336	.6936167
6.6	.9220237	2.027607	-3.112859	.6986807
7.92	.9319586	2.046904	-3.11236	.7037322
9.24	.9418935	2.066161	-3.111862	.7087716
10.56	.9518284	2.08538	-3.111365	.713799
11.88	.9617634	2.104559	-3.110868	.7188148
13.2	.9716984	2.123699	-3.110373	.7238192
14.52	.9816333	2.142801	-3.10988	.7288123
15.84	.9915682	2.161845	-3.109386	.7337898
17.16	1.001503	2.180809	-3.108895	.7387457
18.48	1.011438	2.19969	-3.108406	.7436799
19.8	1.021373	2.218489	-3.107918	.7485932
21.12	1.031308	2.237207	-3.107433	.7534856
22.44	1.041243	2.255842	-3.10695	.7583576
23.76	1.051178	2.274395	-3.106468	.7632095
25.08	1.061113	2.292866	-3.105989	.7680416
26.4	1.071048	2.311255	-3.105511	.7728541
27.72	1.080983	2.329563	-3.105036	.7776474
29.04	1.090918	2.347787	-3.104562	.7824218
30.36	1.100853	2.365931	-3.104089	.7871773
31.68	1.110788	2.383992	-3.103619	.7919144
33	1.120723	2.401971	-3.103151	.7966332

.END PLOT

Stability Results for LADY D with 14 CFR Passengers on Port Side

04-08-09 13:16:46 John J. McMullen & Associates, Inc. Page
 5
 GHS 9.00A General HydroStatics

Part: HULL Component: SPONTOON.C Side: CL Effectiveness:
 1.000

Origin Depth: 0.872
 Trim: Aft 0.43 deg. Heel: Port 5.66 deg.

SPONTOON.C COMPONENT SECTIONS

Section Location	Baseline Depth	Section			Waterline		
		Area	TCtr	VCtr	Width	Ctr	
2.90f	0.85						
2.65f	0.85	0.00	3.08s	0.55	0.00	3.01	
2.65f	0.85	0.00	3.08s	0.54	0.00	3.01	
2.00f	0.86	0.03	3.07s	0.50	0.35	3.00	
1.00f	0.86	0.24	3.04s	0.43	1.04	2.98	
0.00	0.87	0.74	3.02s	0.34	1.81	2.97	
1.32a	0.88	0.76	3.02s	0.35	1.82	2.97	
2.64a	0.89	0.78	3.02s	0.35	1.82	2.97	
3.96a	0.90	0.80	3.02s	0.36	1.83	2.97	
5.28a	0.91	0.82	3.02s	0.36	1.84	2.97	
6.60a	0.92	0.83	3.02s	0.37	1.85	2.97	
7.92a	0.93	0.85	3.02s	0.37	1.86	2.97	
9.24a	0.94	0.87	3.02s	0.38	1.87	2.97	
10.56a	0.95	0.89	3.02s	0.39	1.87	2.97	
11.88a	0.96	0.91	3.02s	0.39	1.88	2.97	
13.20a	0.97	0.93	3.02s	0.40	1.89	2.97	
14.52a	0.98	0.95	3.02s	0.40	1.90	2.97	
15.84a	0.99	0.97	3.02s	0.41	1.91	2.97	
17.16a	1.00	0.98	3.02s	0.41	1.92	2.97	
18.48a	1.01	1.00	3.03s	0.42	1.92	2.97	
19.80a	1.02	1.02	3.03s	0.42	1.93	2.97	
21.12a	1.03	1.04	3.03s	0.43	1.93	2.97	
22.44a	1.04	1.06	3.03s	0.44	1.93	2.97	
23.76a	1.05	1.08	3.03s	0.44	1.94	2.97	
25.08a	1.06	1.10	3.03s	0.45	1.94	2.97	
26.40a	1.07	1.12	3.03s	0.45	1.95	2.97	
27.72a	1.08	1.14	3.03s	0.46	1.95	2.97	
29.04a	1.09	1.16	3.03s	0.46	1.95	2.97	
30.36a	1.10	1.18	3.03s	0.47	1.96	2.97	
31.68a	1.11	1.20	3.03s	0.47	1.96	2.97	
33.00a	1.12	1.22	3.03s	0.48	1.97	2.97	

Distances in FEET-----

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HEL=-5.655192
TRM=.4312275
SAC= 30
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Stability Results for LADY D with 14 CFR Passengers on Port Side

LOC	BLD	ARA	TCA	VCA
-2.654541	.8523695	0	3.080951	.5514518
-2.65	.8524036	0	3.081956	.5407449
-2	.8572958	3.306645E-02	3.072872	.4990777
-1	.8648223	.2352038	3.044266	.4321351
0	.8723488	.74401	3.017657	.3405465
1.32	.8822837	.7620121	3.018215	.3462141
2.64	.8922187	.7800964	3.018774	.3518733
3.96	.9021537	.7982626	3.019331	.3575251
5.28	.9120886	.8165109	3.019889	.3631701
6.6	.9220236	.8348411	3.020446	.368809
7.92	.9319586	.8532534	3.021002	.3744427
9.24	.9418935	.8717476	3.021559	.3800716
10.56	.9518284	.890324	3.022115	.3856962
11.88	.9617634	.9089824	3.022671	.3913172
13.2	.9716984	.9277229	3.023227	.3969351
14.52	.9816333	.9465452	3.023782	.4025501
15.84	.9915683	.9654497	3.024338	.4081629
17.16	1.001503	.9844362	3.024894	.4137737
18.48	1.011438	1.003501	3.025451	.4193819
19.8	1.021373	1.022614	3.026008	.4249785
21.12	1.031308	1.041765	3.026563	.4305625
22.44	1.041243	1.060955	3.027118	.4361343
23.76	1.051178	1.080185	3.027671	.4416949
25.08	1.061113	1.099454	3.028223	.4472453
26.4	1.071048	1.118761	3.028774	.4527854
27.72	1.080983	1.138108	3.029324	.4583164
29.04	1.090918	1.157494	3.029874	.4638387
30.36	1.100853	1.176919	3.030422	.4693528
31.68	1.110788	1.196383	3.03097	.4748593
33	1.120723	1.215886	3.031516	.4803586

.END PLOT

Stability Results for LADY D with 14 CFR Passengers Forward

04-08-09 13:17:08 John J. McMullen & Associates, Inc. Page
1
GHS 9.00A General HydroStatics

WEIGHT and DISPLACEMENT STATUS
 Baseline draft: 1.309 @ Origin
 Trim: Fwd 1.14 deg., Heel: Stbd 0.12 deg.
 Part-----Weight (LT)----LCG-----TCG-----VCG
 WEIGHT 2.98 13.49a 0.02s 3.86
 SpGr-----Displ (LT)----LCB-----TCB-----VCB-----
 RefHt
 HULL 1.000 2.98 13.42a 0.03s 0.60 -
 1.31
 -
 Righting Arms: 0.00 0.00
 Distances in FEET.-----

HYDROSTATIC PROPERTIES

Trim: Fwd 1.14 deg., Heel: Stbd 0.12 deg., VCG = 3.86

LCF	Displacement	Buoyancy-Ctr.	Weight/	Moment/					
Draft----	Weight (LT)	LCB-----	VCB-----	Inch-----					
GMT		LCF--	Deg trim---	GML-----					
9.17	0.997	2.98	13.42a	0.60	0.31	15.74a	6.31	121.4	
LT.	Distances in FEET.				Specific Gravity = 1.000.				Moment in Ft-
	LT.								
	Draft is from Baseline.								

RIGHTING ARMS vs HEEL ANGLE

LCG = 13.49a TCG = 0.02s VCG = 3.86

Origin Depth	Degrees of Trim	Displacement Heel	Weight (LT)	Righting Arms in Trim	Flood Pt in Heel	--Height
1.308	1.13f	0.12s	2.98	0.00	0.000	0.63(2)
1.309	1.14f	1.12s	2.98	0.00	0.160s	0.57(2)
1.310	1.14f	2.12s	2.98	0.00	0.319s	0.51(2)
1.312	1.15f	3.12s	2.98	0.00	0.475s	0.46(2)
1.314	1.16f	4.12s	2.98	0.00	0.629s	0.40(2)
1.317	1.18f	5.12s	2.98	0.00	0.778s	0.34(2)
1.322	1.21f	6.12s	2.98	0.00	0.923s	0.27(2)
1.328	1.24f	7.12s	2.98	0.00	1.060s	0.21(2)
1.335	1.27f	8.12s	2.98	0.00	1.190s	0.14(2)
1.346	1.32f	9.12s	2.98	0.00	1.309s	0.07(2)
1.358	1.38f	10.04s	2.98	0.00	1.408s	0.00(2)
1.360	1.39f	10.12s	2.98	0.00	1.415s	-0.01(2)
1.383	1.48f	11.12s	2.98	0.00	1.500s	-0.09(2)
1.420	1.63f	12.12s	2.98	0.00	1.555s	-0.20(2)
1.470	1.83f	13.12s	2.98	0.00	1.578s	-0.32(2)
1.495	1.93f	13.57s	2.98	0.00	1.580s	-0.38(2)
1.527	2.06f	14.12s	2.98	0.00	1.577s	-0.45(2)
1.587	2.30f	15.12s	2.98	0.00	1.560s	-0.58(2)
1.649	2.55f	16.12s	2.98	0.00	1.531s	-0.72(2)
1.710	2.80f	17.12s	2.98	0.00	1.495s	-0.85(2)
1.771	3.05f	18.12s	2.98	0.00	1.453s	-0.99(2)
1.830	3.30f	19.12s	2.98	0.00	1.407s	-1.12(2)
1.888	3.54f	20.12s	2.98	0.00	1.359s	-1.26(2)

Distances in FEET.---Specific Gravity = 1.000.-----

Stability Results for LADY D with 14 CFR Passengers Forward

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+
Critical Point----- LCP----TCP----VCP
(2) top of pontoon fwd      FLOOD     3.00f    3.08    2.00
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ORV=Baseline
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FCG= 13.49 .02 3.86
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DEP TRM HEL DWT RAT RAH HFP NFP
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2
 1.309154 -1.1371  1.124896  2.979722 -6.577739E-06  .159799  .5700189  2
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 1.31402 -1.164847  4.124897  2.979995 -2.047338E-05  .6289682  .3976833  2
 1.317342 -1.182635  5.124897  2.980012 -2.16711E-05  .778415  .3369832  2
 1.321761 -1.205626  6.124897  2.98004  2.450691E-07  .9225673  .274389  2
 1.327595 -1.235021  7.124897  2.980082  3.393815E-05  1.060139  .2095363  2
 1.33529 -1.272448  8.124896  2.980138  1.105897E-04  1.189613  .1419098  2
 1.345606 -1.320683  9.124896  2.980207  2.882223E-04  1.308996  7.062054E-02
2
 1.358489 -1.379424  10.0442  2.97945  2.040868E-05  1.40766  5.242825E-04  2
 1.36028 -1.385981  10.1249  2.980246 -3.045294E-06  1.415035 -6.38032E-03  2
 1.383028 -1.481808  11.1249  2.9804  3.12502E-03  1.500359 -9.350622E-02  2
 1.419945 -1.632705  12.1249  2.979692  2.31156E-03  1.554844 -.1981328  2
 1.469685 -1.831563  13.1249  2.979849  6.789065E-04  1.577783 -.3185221  2
 1.494701 -1.931199  13.57481  2.980052  4.493372E-04  1.579889 -.3759892  2
 1.526886 -2.059481  14.1249  2.980287 -3.341335E-04  1.576785 -.4482962  2
 1.587077 -2.301407  15.1249  2.980064 -1.360673E-04  1.559789 -.582165  2
 1.648566 -2.550252  16.1249  2.979879 -3.03055E-04  1.531275 -.7180391  2
 1.709974 -2.800368  17.1249  2.979901 -2.926413E-04  1.495004 -.8542171  2
 1.770674 -3.050196  18.1249  2.979993 -1.985554E-04  1.453154 -.9899682  2
 1.830105 -3.298375  19.1249  2.980037 -2.094219E-04  1.407383 -.124635  2
 1.887736 -3.542625  20.1249  2.980045 -1.903318E-04  1.359015 -.1257542  2
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Stability Results for LADY D with 14 CFR Passengers Forward

04-08-09 13:17:08 John J. McMullen & Associates, Inc. Page
3
GHS 9.00A General HydroStatics

Part: HULL Component: PPONTOON.C Side: CL Effectiveness:
1.000
Origin Depth: 1.309
Trim: Fwd 1.14 deg. Heel: Stbd 0.12 deg.

PPONTOON.C COMPONENT SECTIONS

Section Location	Baseline Depth	Area	Sect i on TCtr	VCtr	Waterline Width	Ctr
2.90f	1.37					
2.83f	1.36	0.00	3.08p	1.36	0.08	-3.08
2.65f	1.36	0.12	3.08p	1.01	0.20	-3.08
2.00f	1.35	0.49	3.08p	0.94	0.63	-3.08
1.00f	1.33	1.20	3.08p	0.85	1.32	-3.08
0.00	1.31	2.17	3.08p	0.73	1.90	-3.08
1.32a	1.28	2.12	3.08p	0.72	1.92	-3.08
2.64a	1.26	2.07	3.08p	0.71	1.94	-3.08
3.96a	1.23	2.01	3.08p	0.69	1.95	-3.08
5.28a	1.20	1.96	3.08p	0.68	1.97	-3.08
6.60a	1.18	1.91	3.08p	0.67	1.97	-3.08
7.92a	1.15	1.86	3.08p	0.65	1.98	-3.08
9.24a	1.13	1.81	3.08p	0.64	1.98	-3.08
10.56a	1.10	1.76	3.08p	0.63	1.99	-3.08
11.88a	1.07	1.70	3.08p	0.61	1.99	-3.08
13.20a	1.05	1.65	3.08p	0.60	2.00	-3.08
14.52a	1.02	1.60	3.08p	0.58	2.00	-3.08
15.84a	1.00	1.55	3.08p	0.57	2.00	-3.08
17.16a	0.97	1.49	3.08p	0.56	2.00	-3.08
18.48a	0.94	1.44	3.08p	0.54	1.99	-3.08
19.80a	0.92	1.39	3.08p	0.53	1.99	-3.08
21.12a	0.89	1.34	3.08p	0.51	1.98	-3.08
22.44a	0.86	1.29	3.08p	0.50	1.98	-3.08
23.76a	0.84	1.23	3.08p	0.48	1.97	-3.08
25.08a	0.81	1.18	3.08p	0.47	1.97	-3.08
26.40a	0.79	1.13	3.08p	0.45	1.95	-3.08
27.72a	0.76	1.08	3.08p	0.44	1.94	-3.08
29.04a	0.73	1.03	3.08p	0.42	1.92	-3.08
30.36a	0.71	0.98	3.08p	0.41	1.91	-3.08
31.68a	0.68	0.93	3.08p	0.39	1.89	-3.08
33.00a	0.65	0.88	3.08p	0.38	1.87	-3.08

Distances in FEET.-----

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HEL= .1248964
TRM=-1.135138
SAC= 30

Stability Results for LADY D with 14 CFR Passengers Forward

LOC	BLD	ARA	TCA	VCA
-2.82696	1.36489	0	-3.082689	1.358174
-2.65	1.361384	.117794	-3.082987	1.012551
-2	1.348505	.4888068	-3.082906	.9442775
-1	1.32869	1.198571	-3.082649	.8532689
0	1.308876	2.165409	-3.082421	.7334198
1.32	1.28272	2.115412	-3.082392	.7202875
2.64	1.256565	2.065	-3.082362	.7070407
3.96	1.23041	2.014173	-3.08233	.6936737
5.28	1.204255	1.962932	-3.082295	.6801797
6.6	1.1781	1.911401	-3.08227	.6665847
7.92	1.151945	1.859737	-3.082244	.6529246
9.24	1.12579	1.807939	-3.082217	.639195
10.56	1.099635	1.75601	-3.082187	.6253908
11.88	1.073479	1.703947	-3.082156	.6115056
13.2	1.047324	1.651752	-3.082123	.5975331
14.52	1.021169	1.599424	-3.082087	.5834652
15.84	.9950141	1.546991	-3.082055	.5693009
17.16	.968859	1.49465	-3.08203	.5550858
18.48	.9427038	1.442441	-3.082002	.5408256
19.8	.9165487	1.390364	-3.081972	.5265144
21.12	.8903936	1.338421	-3.081941	.5121452
22.44	.8642385	1.286609	-3.081907	.4977104
23.76	.8380834	1.234931	-3.081869	.4832003
25.08	.8119283	1.183385	-3.08183	.4686044
26.4	.7857732	1.132101	-3.081805	.4539477
27.72	.759618	1.081231	-3.081779	.4392662
29.04	.7334629	1.030775	-3.08175	.4245533
30.36	.7073078	.9807346	-3.081719	.4098007
31.68	.6811526	.9311088	-3.081684	.3949983
33	.6549975	.8818977	-3.081645	.3801341

.END PLOT

Stability Results for LADY D with 14 CFR Passengers Forward

04-08-09 13:17:08 John J. McMullen & Associates, Inc. Page
5
GHS 9.00A General HydroStatics

Part: HULL Component: SPONTOON.C Side: CL Effectiveness:
1.000
Origin Depth: 1.309
Trim: Fwd 1.14 deg. Heel: Stbd 0.12 deg.

SPONTOON.C COMPONENT SECTIONS

Section	Baseline	Section			Waterline	
Location	Depth	Area	TCtr	VCtr	Width	Ctr
2.90f	1.37					
2.83f	1.36	0.00	3.08s	1.37	0.08	3.09
2.65f	1.36	0.12	3.08s	1.02	0.20	3.09
2.00f	1.35	0.50	3.08s	0.95	0.63	3.09
1.00f	1.33	1.22	3.08s	0.86	1.32	3.09
0.00	1.31	2.19	3.08s	0.74	1.90	3.09
1.32a	1.28	2.14	3.08s	0.73	1.91	3.09
2.64a	1.26	2.09	3.08s	0.71	1.93	3.09
3.96a	1.23	2.04	3.08s	0.70	1.94	3.09
5.28a	1.20	1.99	3.08s	0.69	1.96	3.08
6.60a	1.18	1.94	3.08s	0.67	1.97	3.09
7.92a	1.15	1.89	3.08s	0.66	1.98	3.09
9.24a	1.13	1.83	3.08s	0.65	1.98	3.09
10.56a	1.10	1.78	3.08s	0.63	1.99	3.09
11.88a	1.07	1.73	3.08s	0.62	1.99	3.09
13.20a	1.05	1.68	3.08s	0.60	2.00	3.09
14.52a	1.02	1.63	3.08s	0.59	2.00	3.09
15.84a	1.00	1.57	3.08s	0.58	2.01	3.09
17.16a	0.97	1.52	3.08s	0.56	2.00	3.09
18.48a	0.94	1.47	3.08s	0.55	2.00	3.09
19.80a	0.92	1.42	3.08s	0.53	1.99	3.09
21.12a	0.89	1.37	3.08s	0.52	1.99	3.09
22.44a	0.86	1.31	3.08s	0.51	1.98	3.09
23.76a	0.84	1.26	3.08s	0.49	1.98	3.09
25.08a	0.81	1.21	3.08s	0.48	1.97	3.08
26.40a	0.79	1.16	3.08s	0.46	1.96	3.09
27.72a	0.76	1.11	3.08s	0.45	1.95	3.09
29.04a	0.73	1.06	3.08s	0.43	1.93	3.09
30.36a	0.71	1.01	3.08s	0.42	1.91	3.09
31.68a	0.68	0.96	3.08s	0.40	1.90	3.09
33.00a	0.65	0.91	3.08s	0.39	1.88	3.09

Distances in FEET.-----

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CMP=SPONTOON.C
HEL= .1248964
TRM=-1.135138
SAC= 30

Stability Results for LADY D with 14 CFR Passengers Forward

LOC	BLD	ARA	TCA	VCA
-2.829844	1.364947	0	3.083303	1.371672
-2.65	1.361384	.1205274	3.083013	1.020463
-2	1.348505	.4973031	3.083092	.9511836
-1	1.32869	1.216328	3.083343	.8602094
0	1.308876	2.190941	3.083565	.7401258
1.32	1.28272	2.141157	3.083592	.7270499
2.64	1.256565	2.090958	3.083622	.7138627
3.96	1.23041	2.040344	3.083653	.7005582
5.28	1.204255	1.989316	3.083686	.6871305
6.6	1.1781	1.937899	3.083717	.673579
7.92	1.151945	1.886303	3.083742	.6599527
9.24	1.12579	1.834574	3.083769	.6462595
10.56	1.099635	1.782712	3.083797	.6324943
11.88	1.073479	1.730718	3.083827	.6186515
13.2	1.047324	1.678591	3.08386	.6047247
14.52	1.021169	1.626331	3.083894	.5907069
15.84	.9950141	1.57394	3.083931	.5765899
17.16	.968859	1.521531	3.083957	.5623962
18.48	.9427038	1.469254	3.083983	.5481597
19.8	.9165487	1.417109	3.084012	.5338756
21.12	.8903936	1.365098	3.084042	.5195371
22.44	.8642385	1.313218	3.084075	.5051371
23.76	.8380834	1.261472	3.084111	.490667
25.08	.8119283	1.209858	3.084149	.4761166
26.4	.7857732	1.158405	3.084182	.4614825
27.72	.759618	1.107321	3.084207	.4468144
29.04	.7334629	1.056652	3.084234	.4321186
30.36	.7073078	1.006398	3.084264	.4173875
31.68	.6811526	.9565594	3.084297	.4026121
33	.6549975	.9071351	3.084334	.3877814

.END PLOT

Stability Results for LADY D with 14 CFR Passengers Aft

04-08-09 13:17:28 John J. McMullen & Associates, Inc. Page
1
GHS 9.00A General HydroStatics

WEIGHT and DISPLACEMENT STATUS
 Baseline draft: 0.431 @ Origin
 Trim: Aft 2.04 deg., Heel: Stbd 0.13 deg.
 Part-----Weight (LT)----LCG-----TCG-----VCG
 WEIGHT 2.98 20.17a 0.02s 3.86
 SpGr-----Displ (LT)----LCB-----TCB-----VCB-----
 RefHt
 HULL 1.000 2.98 20.29a 0.03s 0.65 -
 0.43

 -
 Righting Arms: 0.00 0.00
 Distances in FEET.-----

HYDROSTATIC PROPERTIES

Trim: Aft 2.04 deg., Heel: Stbd 0.13 deg., VCG = 3.86

LCF	Displacement	Buoyancy-Ctr.	Weight/	Moment/				
Draft----	Weight (LT)	LCB-----	VCB-----	Inch-----				
GMT		LCF	Deg trim	GML-----				
8.43	1.003	2.98	20.29a	0.65	0.30	16.04a	5.47	105.1
LT.	Distances in FEET.-----Specific Gravity = 1.000.-----Moment in Ft-							
	Draft is from Baseline.							

RIGHTING ARMS vs HEEL ANGLE
 I:CG = 20.17a TCG = 0.02s VCG = 3.86

Origin	Degrees of	Displacement	Righting	Arms	Flood Pt	
Depth	Trim	Heel	Weight (LT)	in Trim	in Heel	--Height
0.432	2.04a	0.13s	2.98	0.00	0.000	0.39(1)
0.429	2.05a	1.13s	2.98	0.00	0.147s	0.33(1)
0.424	2.06a	2.13s	2.98	0.00	0.292s	0.27(1)
0.416	2.09a	3.13s	2.98	0.00	0.433s	0.21(1)
0.404	2.12a	4.13s	2.98	0.00	0.570s	0.14(1)
0.389	2.17a	5.13s	2.98	0.00	0.700s	0.07(1)
0.367	2.24a	6.13s	2.98	0.00	0.820s	0.00(1)
0.338	2.34a	7.13s	2.98	0.00	0.924s	-0.08(1)
0.297	2.47a	8.13s	2.98	0.00	1.005s	-0.18(1)
0.245	2.65a	9.13s	2.98	0.00	1.061s	-0.29(1)
0.183	2.86a	10.13s	2.98	0.00	1.095s	-0.40(1)
0.115	3.09a	11.13s	2.98	0.00	1.111s	-0.53(1)
0.044	3.32a	12.13s	2.98	0.00	1.115s	-0.65(1)
0.014	3.42a	12.56s	2.98	0.00	1.116s	-0.70(1)
-0.028	3.56a	13.13s	2.98	0.00	1.115s	-0.77(1)
-0.099	3.78a	14.13s	2.98	0.00	1.111s	-0.89(1)
-0.171	4.00a	15.13s	2.98	0.00	1.103s	-1.01(1)
-0.244	4.22a	16.13s	2.98	0.00	1.091s	-1.12(1)
-0.316	4.43a	17.13s	2.98	0.00	1.075s	-1.23(1)
-0.390	4.65a	18.13s	2.98	0.00	1.056s	-1.34(1)
-0.462	4.85a	19.13s	2.98	0.00	1.035s	-1.45(1)
-0.535	5.06a	20.13s	2.98	0.00	1.011s	-1.56(1)

Stability Results for LADY D with 14 CFR Passengers Aft

```

          Critical Point----- LCP----TCP----VCP
          (1) top of pontoon aft           FLOOD   33.00a   3.08    2.00
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FCG= 20.17 .02 3.86
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  .4293668  2.045592  1.134894  2.979704 -1.296077E-04  .1467378  .3300163  1
  .4240257  2.062027  2.134894  2.980246  1.577958E-03  .2916074  .2711316  1
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  .1830508  2.859762  10.13489  2.979739  2.029464E-04  1.09467 -.4049596  1
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1
  1.403511E-02  3.422803  12.55936  2.980309 -5.650212E-04  1.115737 -.7048012
1
  -2.761285E-02  3.556135  13.13489  2.980079  7.959907E-04  1.115031 -.7745795
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Stability Results for LADY D with 14 CFR Passengers Aft

04-08-09 13:17:28 John J. McMullen & Associates, Inc. Page
3
GHS 9.00A General HydroStatics

Part: HULL Component: PPONTOON.C Side: CL Effectiveness:
1.000
Origin Depth: 0.431
Trim: Aft 2.04 deg. Heel: Stbd 0.13 deg.

PPONTOON.C COMPONENT SECTIONS

Section	Baseline	Section			Waterline	
Location	Depth	Area	TCtr	VCtr	Width	Ctr
2.90f	0.33					
..						
1.83f	0.37	0.00	3.08p	0.36	0.00	-3.08
1.00f	0.40	0.08	3.08p	0.32	0.73	-3.08
0.00	0.43	0.49	3.08p	0.25	1.64	-3.08
1.32a	0.48	0.56	3.08p	0.28	1.70	-3.08
2.64a	0.53	0.65	3.08p	0.31	1.75	-3.08
3.96a	0.57	0.73	3.08p	0.33	1.80	-3.08
5.28a	0.62	0.81	3.08p	0.36	1.85	-3.08
6.60a	0.67	0.90	3.08p	0.39	1.88	-3.08
7.92a	0.71	0.99	3.08p	0.41	1.91	-3.08
9.24a	0.76	1.08	3.08p	0.44	1.94	-3.08
10.56a	0.81	1.17	3.08p	0.47	1.97	-3.08
11.88a	0.85	1.27	3.08p	0.49	1.98	-3.08
13.20a	0.90	1.36	3.08p	0.52	1.99	-3.08
14.52a	0.95	1.45	3.08p	0.54	1.99	-3.08
15.84a	1.00	1.55	3.08p	0.57	2.00	-3.08
17.16a	1.04	1.64	3.08p	0.59	2.00	-3.08
18.48a	1.09	1.73	3.08p	0.62	1.99	-3.08
19.80a	1.14	1.83	3.08p	0.64	1.98	-3.08
21.12a	1.18	1.92	3.08p	0.67	1.97	-3.08
22.44a	1.23	2.01	3.08p	0.69	1.95	-3.08
23.76a	1.28	2.10	3.08p	0.72	1.92	-3.08
25.08a	1.32	2.19	3.08p	0.74	1.89	-3.08
26.40a	1.37	2.28	3.08p	0.76	1.87	-3.08
27.72a	1.42	2.37	3.08p	0.79	1.82	-3.08
29.04a	1.47	2.45	3.08p	0.81	1.77	-3.08
30.36a	1.51	2.54	3.08p	0.83	1.72	-3.08
31.68a	1.56	2.62	3.08p	0.85	1.67	-3.08
33.00a	1.61	2.69	3.08p	0.87	1.60	-3.08

Distances in FEET.-----

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TRM= 2.040217
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LOC BLD ARA TCA VCA

Stability Results for LADY D with 14 CFR Passengers Aft

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-1 .3955033 7.595541E-02 -3.082006 .3218794
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1.32 .47815 .5640287 -3.081297 .2781471
2.64 .5251731 .6450625 -3.081374 .3053284
3.96 .5721962 .7284736 -3.081432 .3323752
5.28 .6192193 .8142619 -3.081475 .3593663
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7.92 .7132656 .9910708 -3.081624 .4128619
9.24 .7602887 1.081489 -3.081682 .4393413
10.56 .8073118 1.173248 -3.08173 .4657183
11.88 .8543349 1.265964 -3.081804 .4919276
13.2 .9013579 1.359112 -3.081871 .5178812
14.52 .9483811 1.45269 -3.081929 .5436319
15.84 .9954042 1.546696 -3.08198 .569221
17.16 1.042427 1.64089 -3.082045 .5946182
18.48 1.08945 1.734684 -3.082109 .619709
19.8 1.136473 1.828048 -3.082166 .6445297
21.12 1.183497 1.920985 -3.082217 .6691153
22.44 1.23052 2.013338 -3.082276 .693454
23.76 1.277543 2.104432 -3.082337 .7174028
25.08 1.324566 2.194185 -3.082392 .7409778
26.4 1.371589 2.282597 -3.082442 .7642094
27.72 1.418612 2.369492 -3.082497 .7870762
29.04 1.465635 2.454102 -3.082554 .8094061
30.36 1.512658 2.536334 -3.082604 .8312055
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Stability Results for LADY D with 14 CFR Passengers Aft

04-08-09 13:17:28 John J. McMullen & Associates, Inc. Page
5
GHS 9.00A General HydroStatics

Part: HULL Component: SPONTOON.C Side: CL Effectiveness:
1.000
Origin Depth: 0.431
Trim: Aft 2.04 deg. Heel: Stbd 0.13 deg.

SPONTOON.C COMPONENT SECTIONS

Section	Baseline	Section			Waterline	
Location	Depth	Area	TCtr	VCtr	Width	Ctr
2.90f	0.33					
...						
1.90f	0.36	0.00	3.08s	0.37	0.00	3.08
1.00f	0.40	0.09	3.08s	0.33	0.76	3.08
0.00	0.43	0.51	3.08s	0.26	1.66	3.09
1.32a	0.48	0.59	3.08s	0.29	1.71	3.09
2.64a	0.53	0.67	3.08s	0.31	1.76	3.09
3.96a	0.57	0.75	3.08s	0.34	1.81	3.09
5.28a	0.62	0.84	3.08s	0.37	1.86	3.09
6.60a	0.67	0.93	3.08s	0.39	1.89	3.09
7.92a	0.71	1.02	3.08s	0.42	1.92	3.09
9.24a	0.76	1.11	3.08s	0.45	1.95	3.09
10.56a	0.81	1.20	3.08s	0.47	1.97	3.09
11.88a	0.85	1.29	3.08s	0.50	1.98	3.09
13.20a	0.90	1.39	3.08s	0.53	1.99	3.09
14.52a	0.95	1.48	3.08s	0.55	2.00	3.09
15.84a	1.00	1.58	3.08s	0.58	2.01	3.09
17.16a	1.04	1.67	3.08s	0.60	2.00	3.09
18.48a	1.09	1.76	3.08s	0.63	1.99	3.09
19.80a	1.14	1.86	3.08s	0.65	1.98	3.09
21.12a	1.18	1.95	3.08s	0.68	1.97	3.09
22.44a	1.23	2.04	3.08s	0.70	1.94	3.09
23.76a	1.28	2.13	3.08s	0.72	1.91	3.09
25.08a	1.32	2.22	3.08s	0.75	1.89	3.09
26.40a	1.37	2.31	3.08s	0.77	1.86	3.09
27.72a	1.42	2.40	3.08s	0.79	1.81	3.09
29.04a	1.47	2.48	3.08s	0.82	1.76	3.099
30.36a	1.51	2.56	3.08s	0.84	1.71	3.099
31.68a	1.56	2.64	3.08s	0.86	1.65	3.099
33.00a	1.61	2.72	3.08s	0.88	1.57	3.099

Distances in FEET.-----

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HEL= .134894
TRM= 2.040217
SAC= 28
LOC BLD ARA TCA VCA

Stability Results for LADY D with 14 CFR Passengers Aft

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1.32	.47815	.5887916	3.084677	.2865592
2.64	.5251731	.6705592	3.084607	.3136882
3.96	.5721962	.7547043	3.084554	.3407109
5.28	.6192193	.8411997	3.084502	.3676879
6.6	.6662424	.9293501	3.084423	.3944706
7.92	.7132656	1.018841	3.084358	.4210503
9.24	.7602887	1.109673	3.084303	.4474932
10.56	.8073118	1.201822	3.084249	.4738401
11.88	.8543349	1.294674	3.084175	.4999645
13.2	.9013579	1.387955	3.084111	.5258504
14.52	.9483811	1.481665	3.084055	.5515472
15.84	.9954042	1.575801	3.084005	.5770929
17.16	1.042427	1.669891	3.083935	.6023956
18.48	1.08945	1.763553	3.083873	.6273987
19.8	1.136473	1.856785	3.083818	.6521434
21.12	1.183497	1.949589	3.083769	.6766623
22.44	1.23052	2.041603	3.083705	.7008894
23.76	1.277543	2.132284	3.083646	.7247192
25.08	1.324566	2.221623	3.083593	.7481853
26.4	1.371589	2.309621	3.083544	.7713159
27.72	1.418612	2.395866	3.083485	.7940282
29.04	1.465635	2.479742	3.083431	.8161913
30.36	1.512658	2.56124	3.083382	.837832
31.68	1.559682	2.640332	3.083335	.8589647
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**Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004**

APPENDIX B

Simulation Data, Time Series and Plots

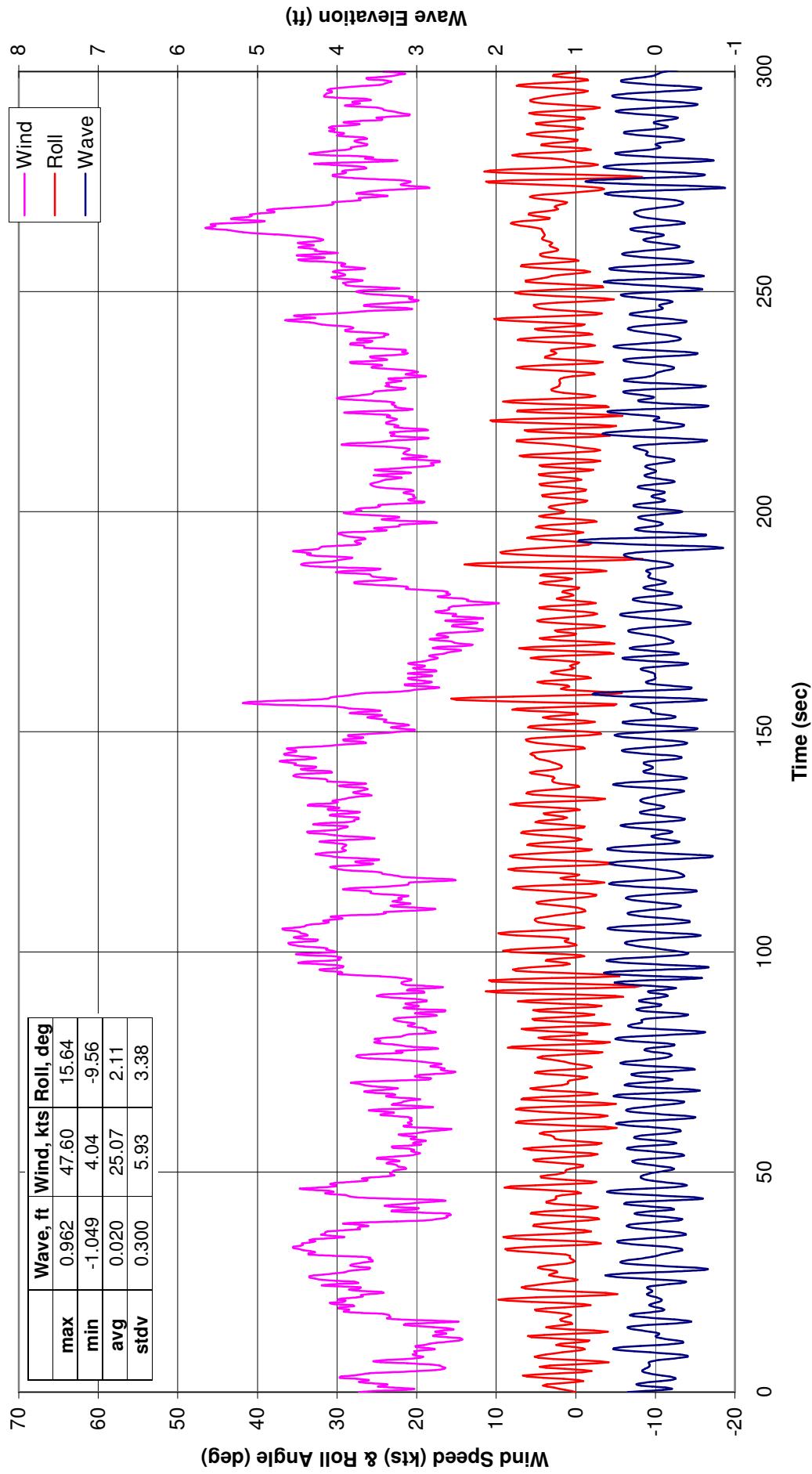
See CD-ROM “JJMA Final Report” for Electronic Files





Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

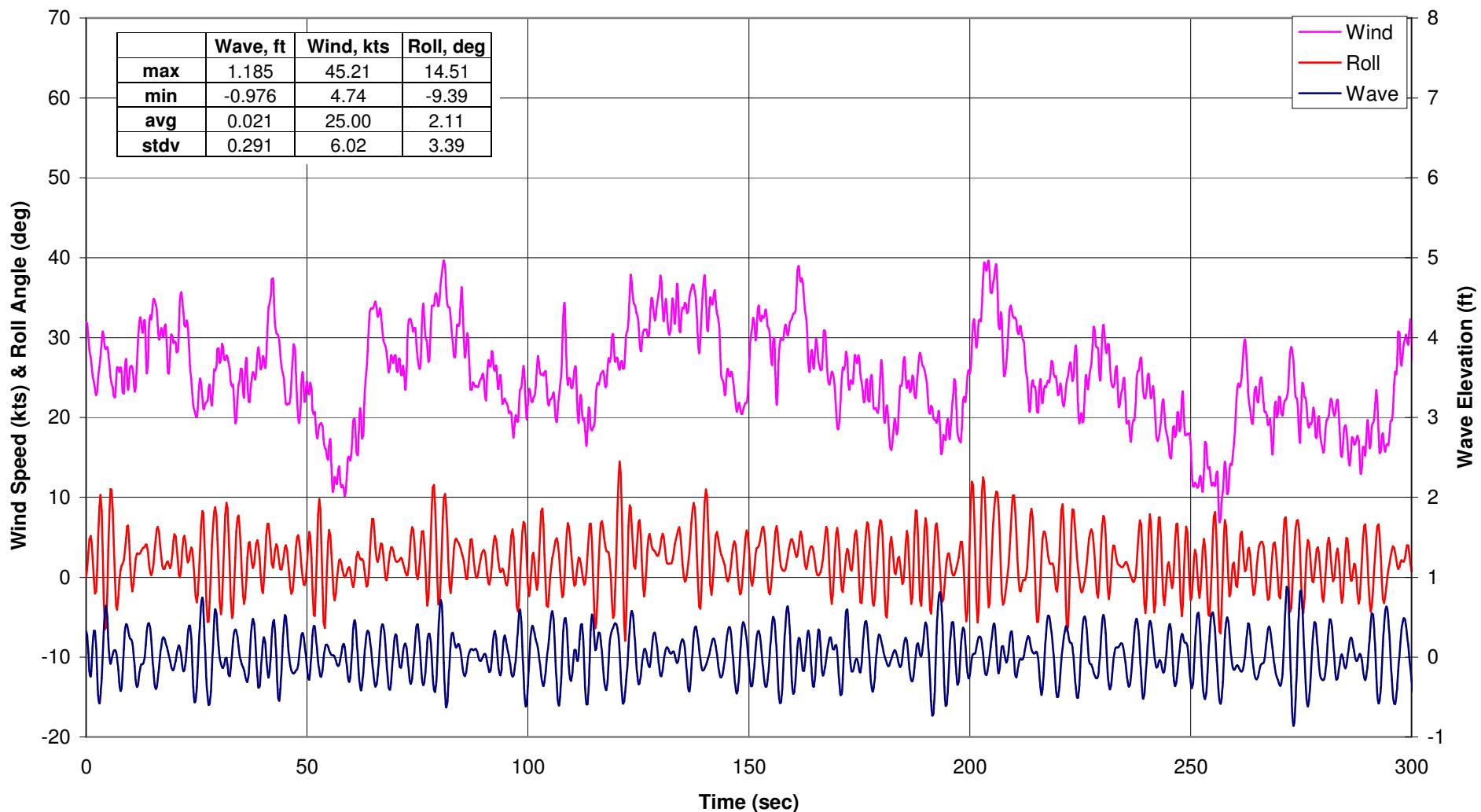
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

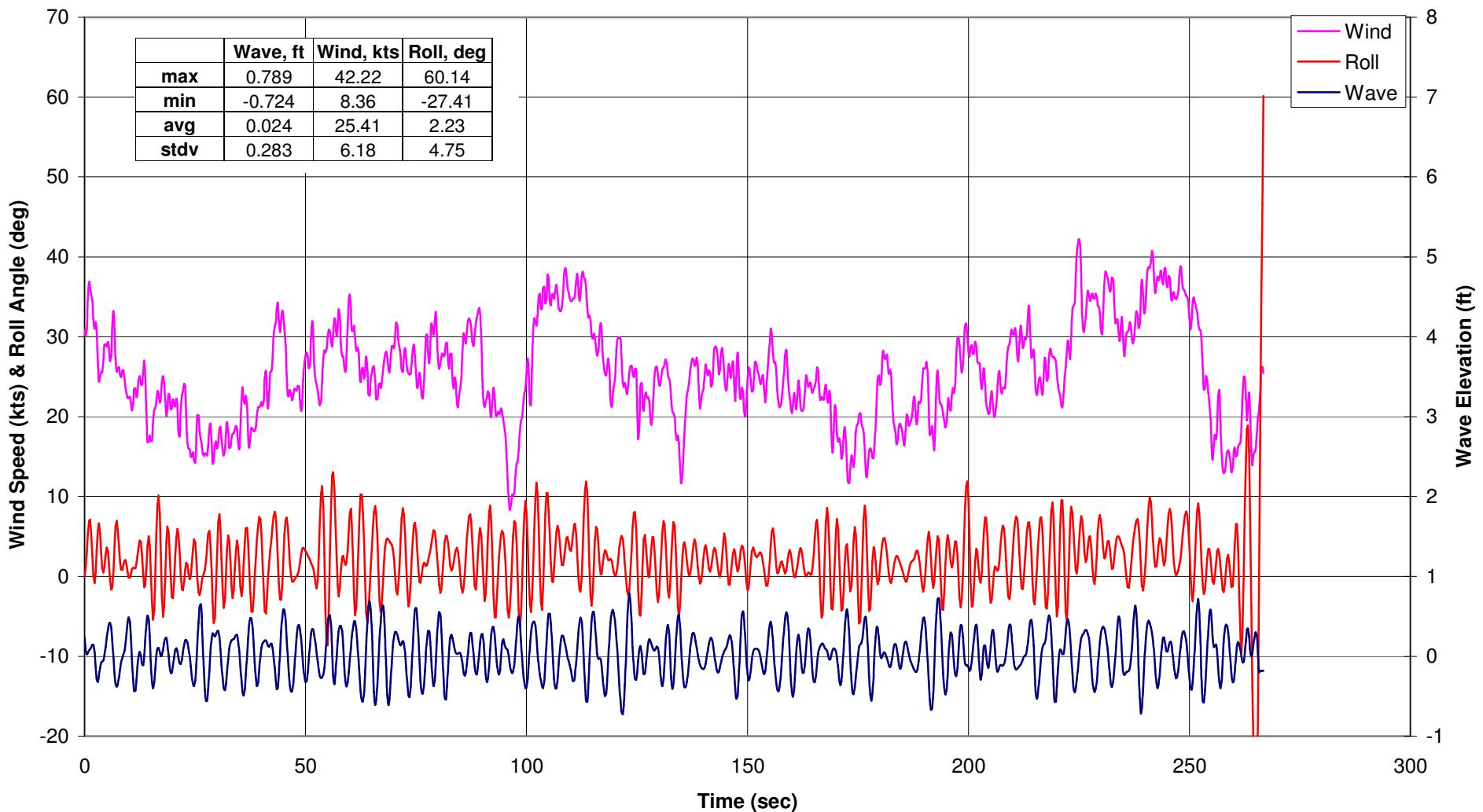
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

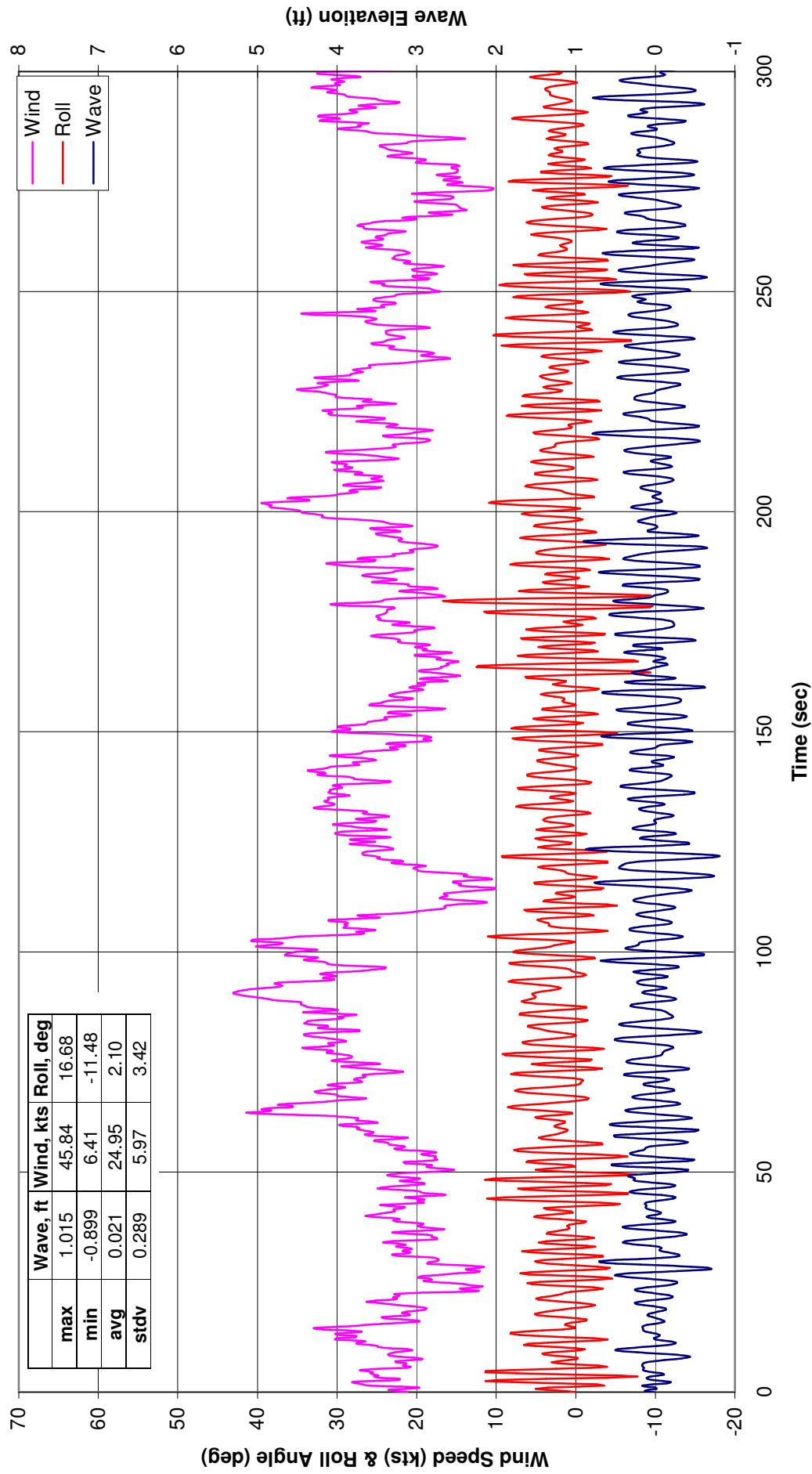
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

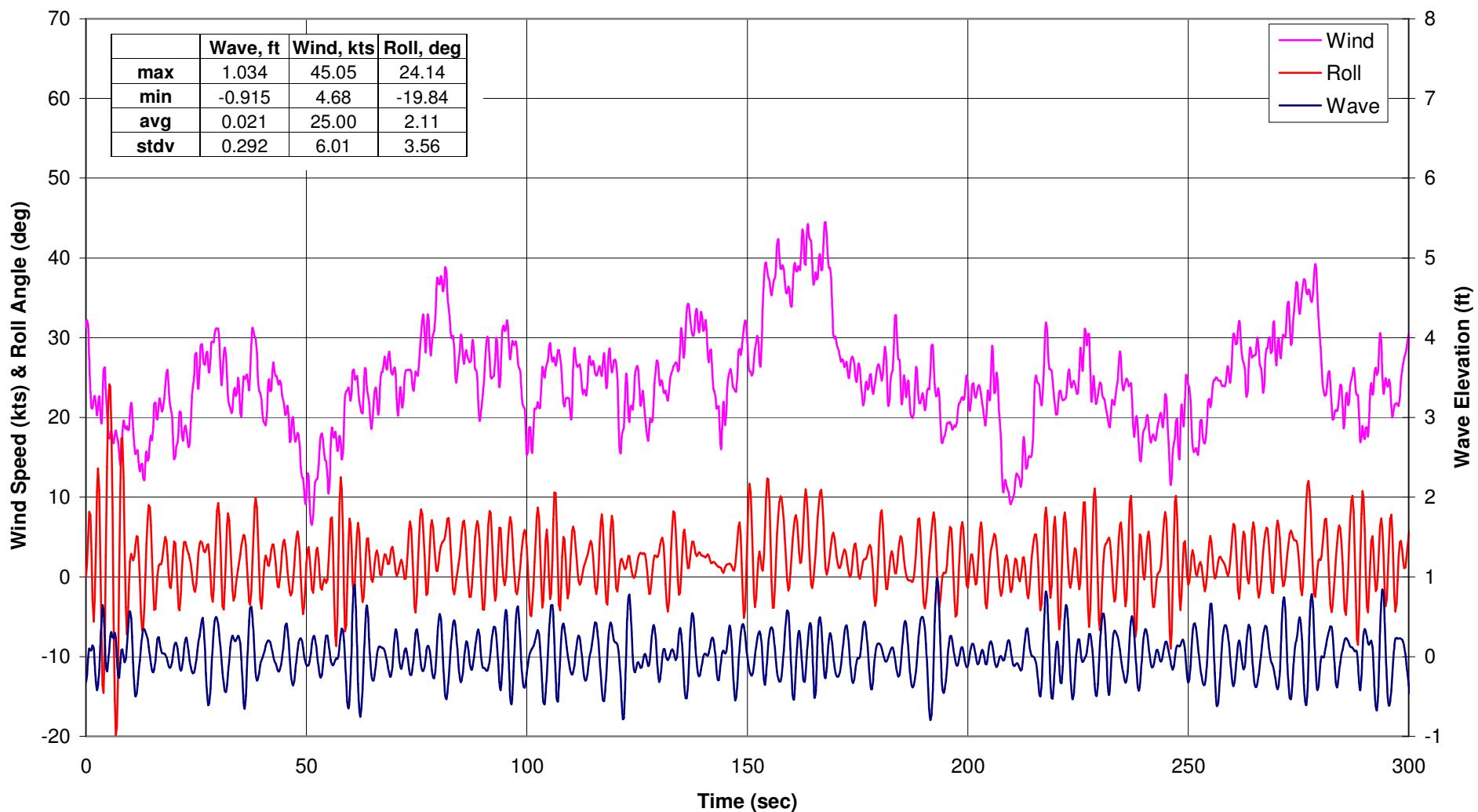
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

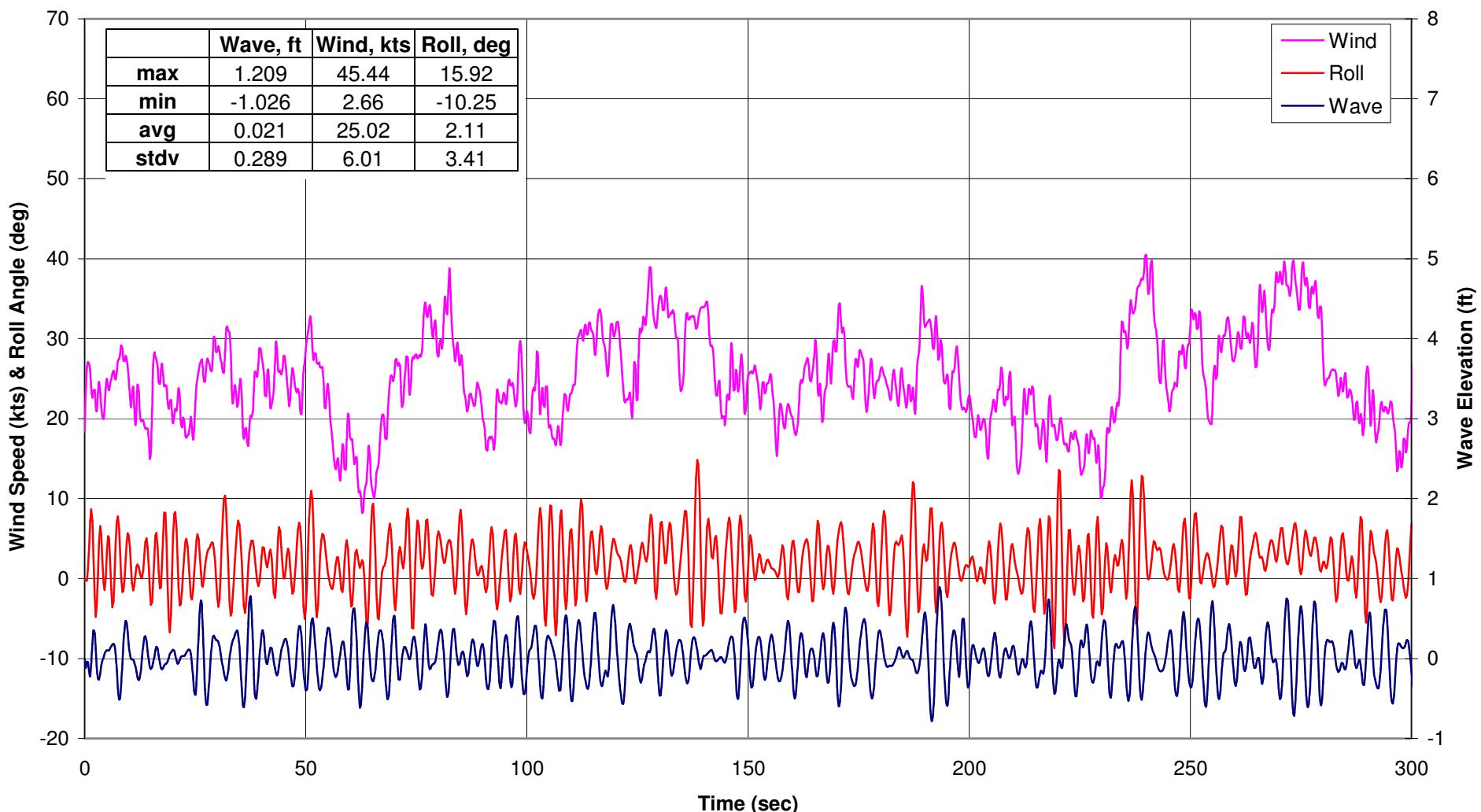
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Contract No. GS-23F-0068
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27 August 2004

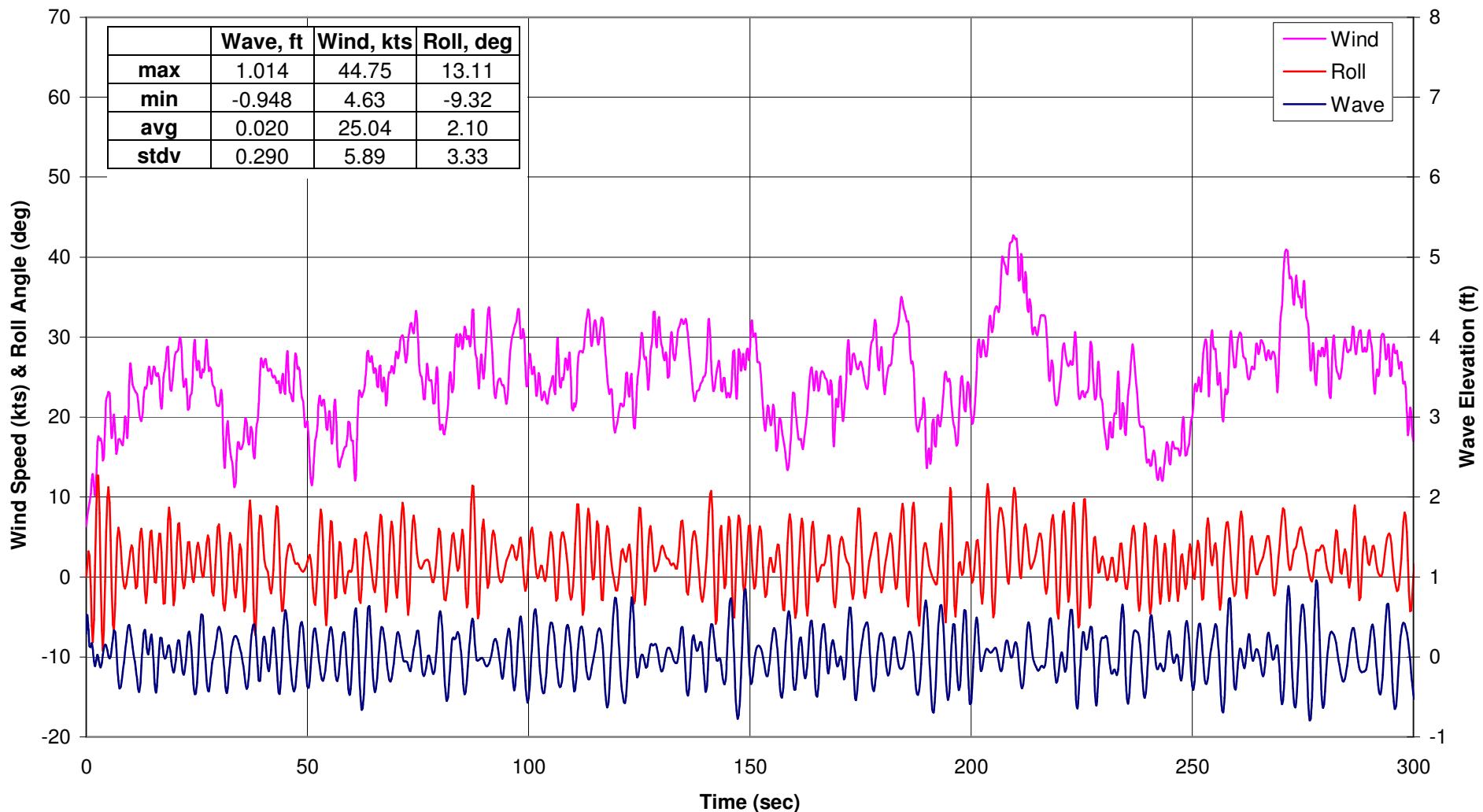
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

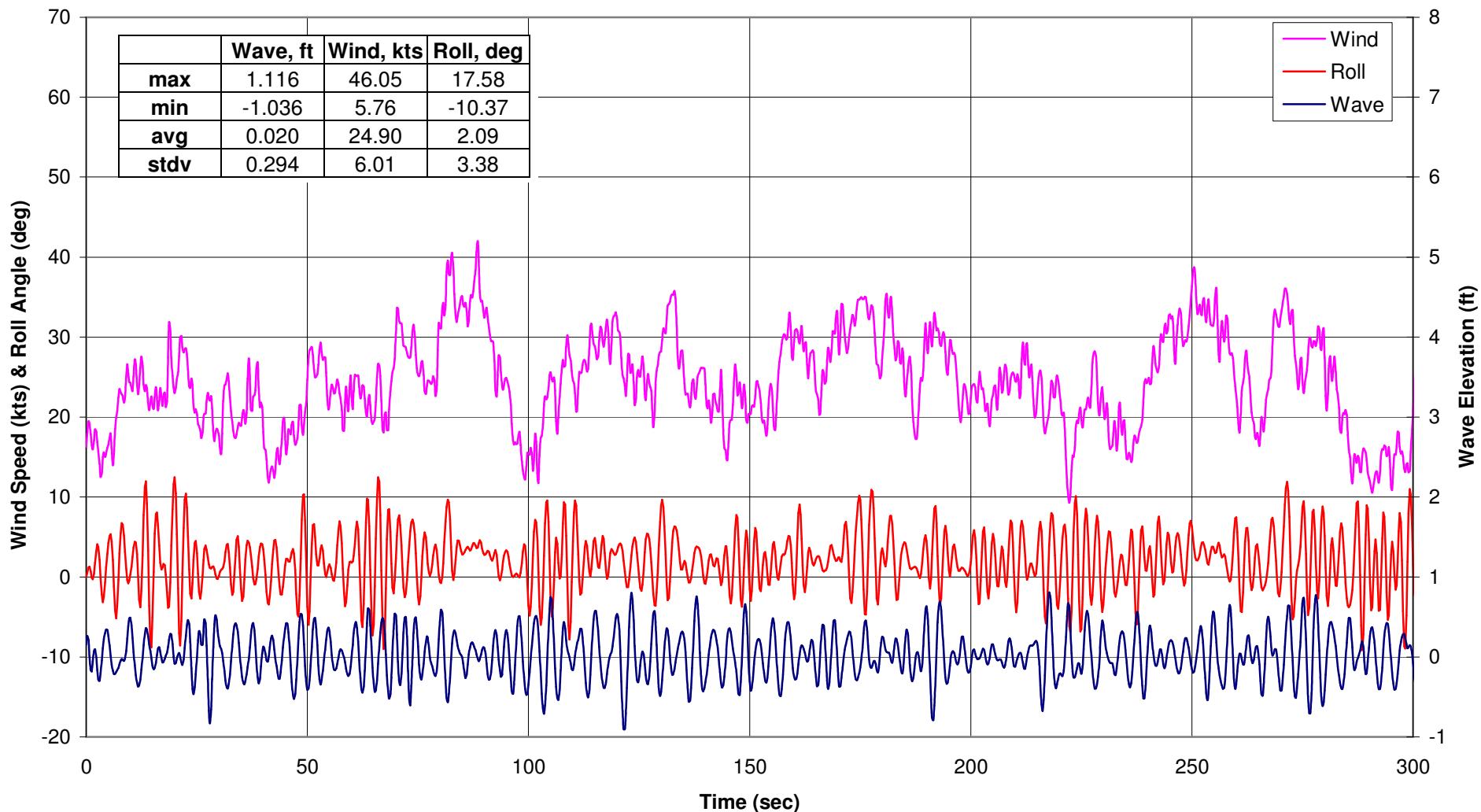
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

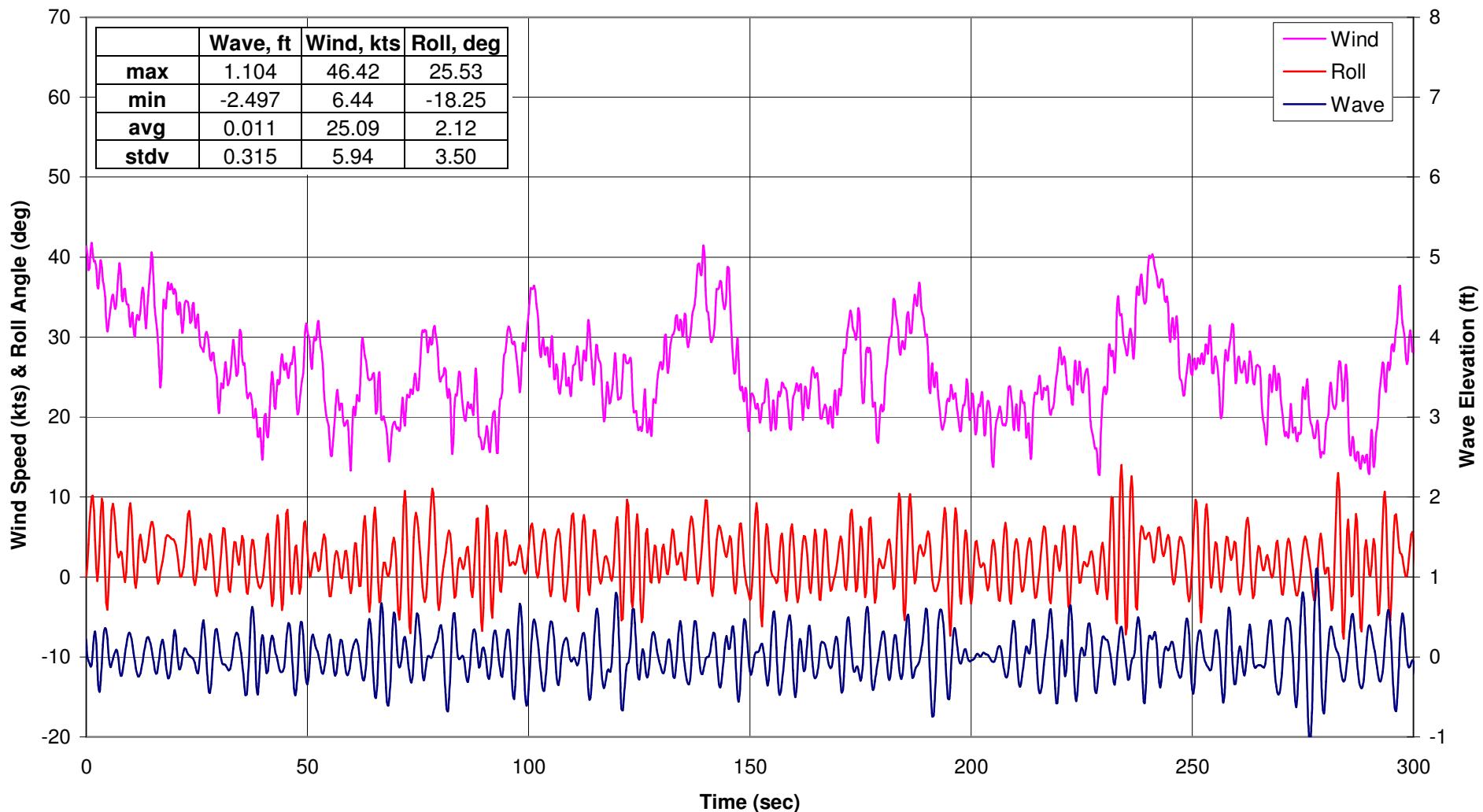
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

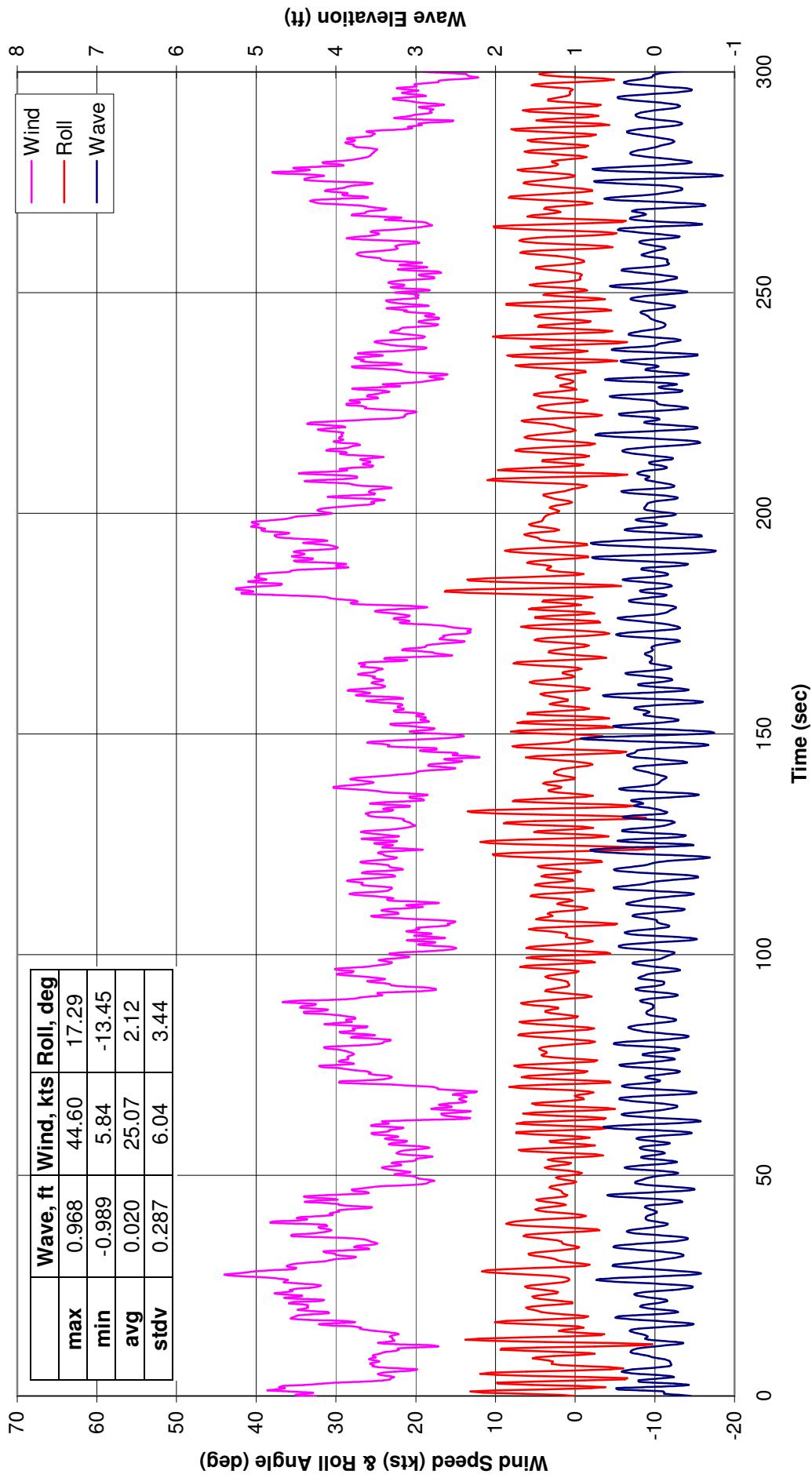
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

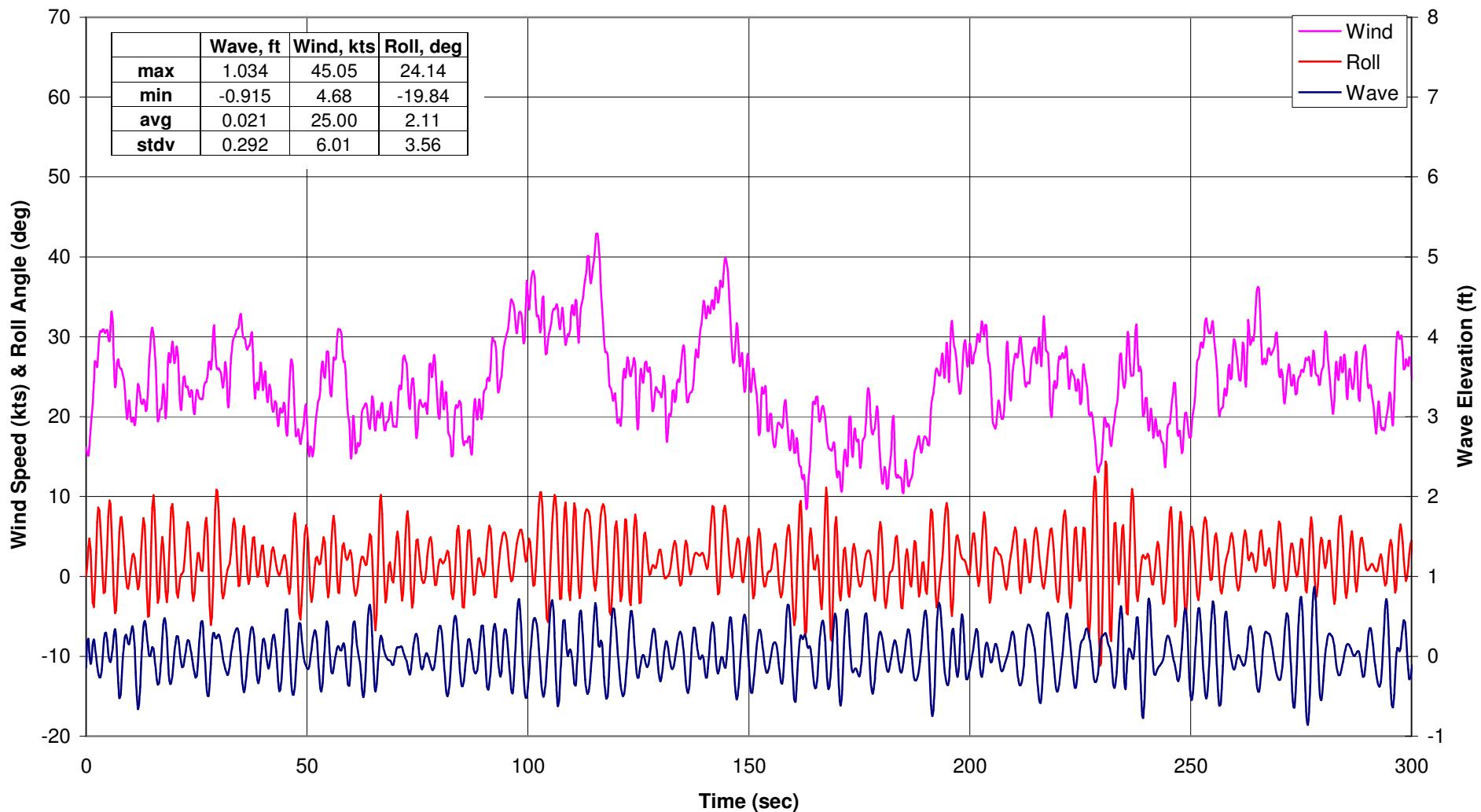
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

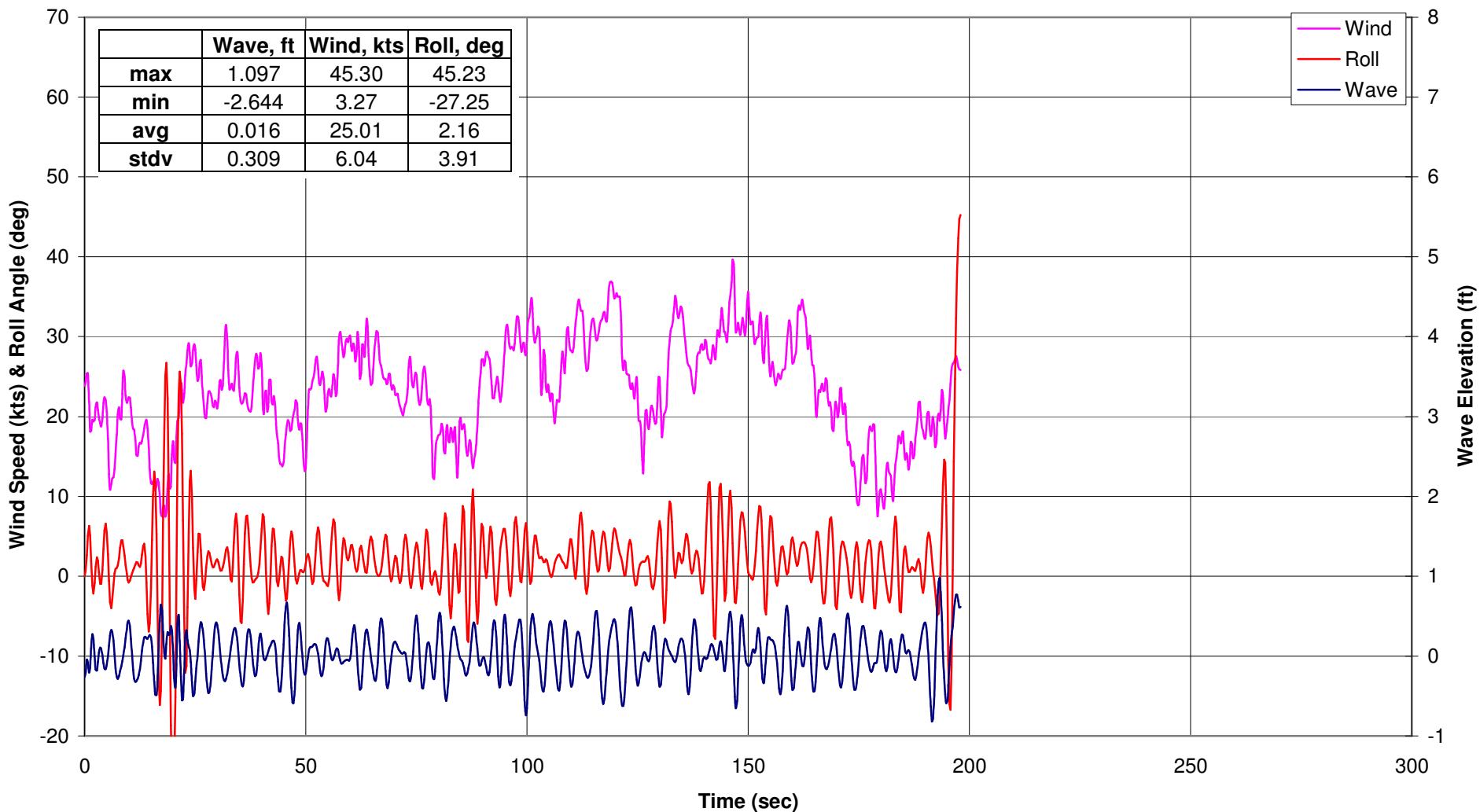
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

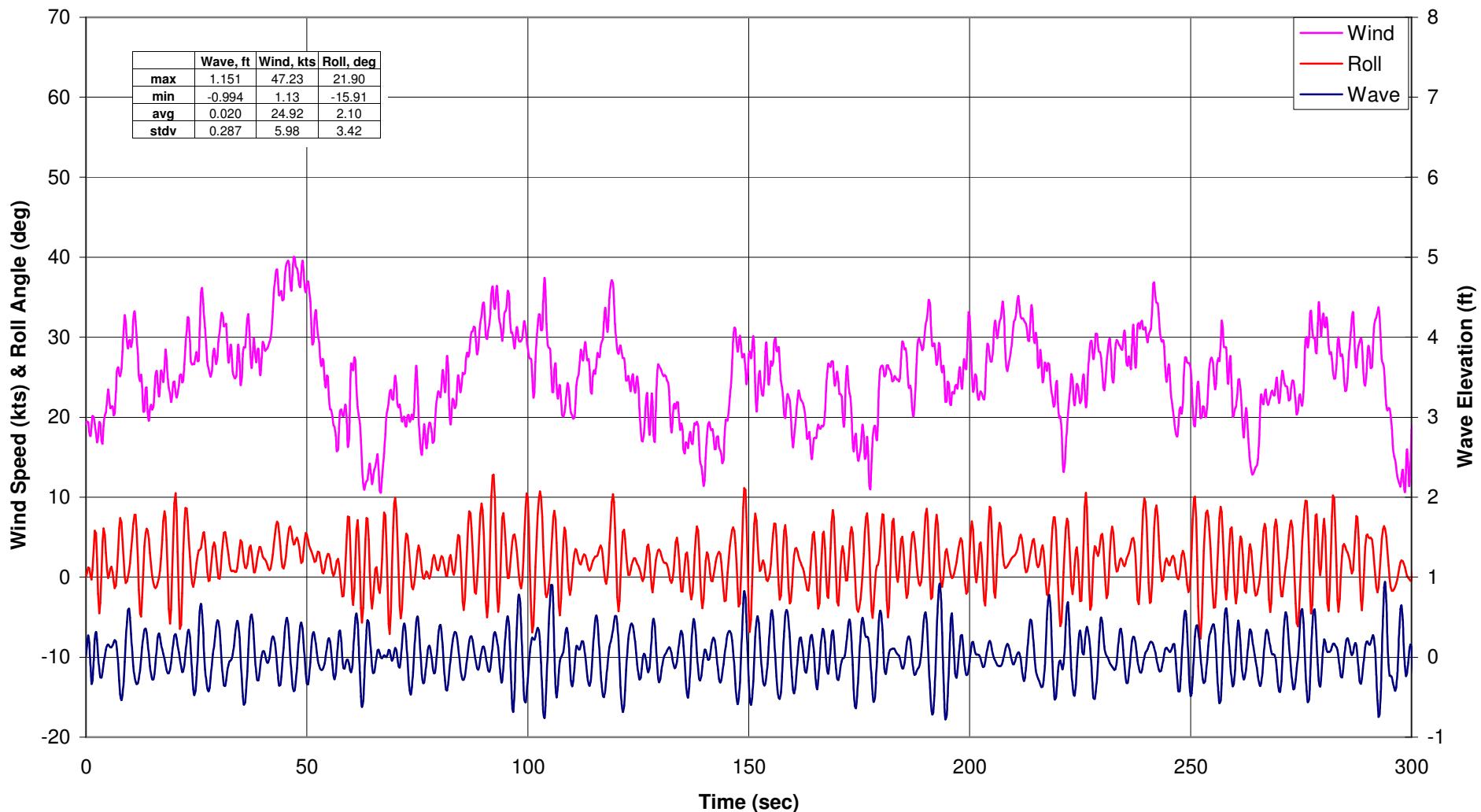
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

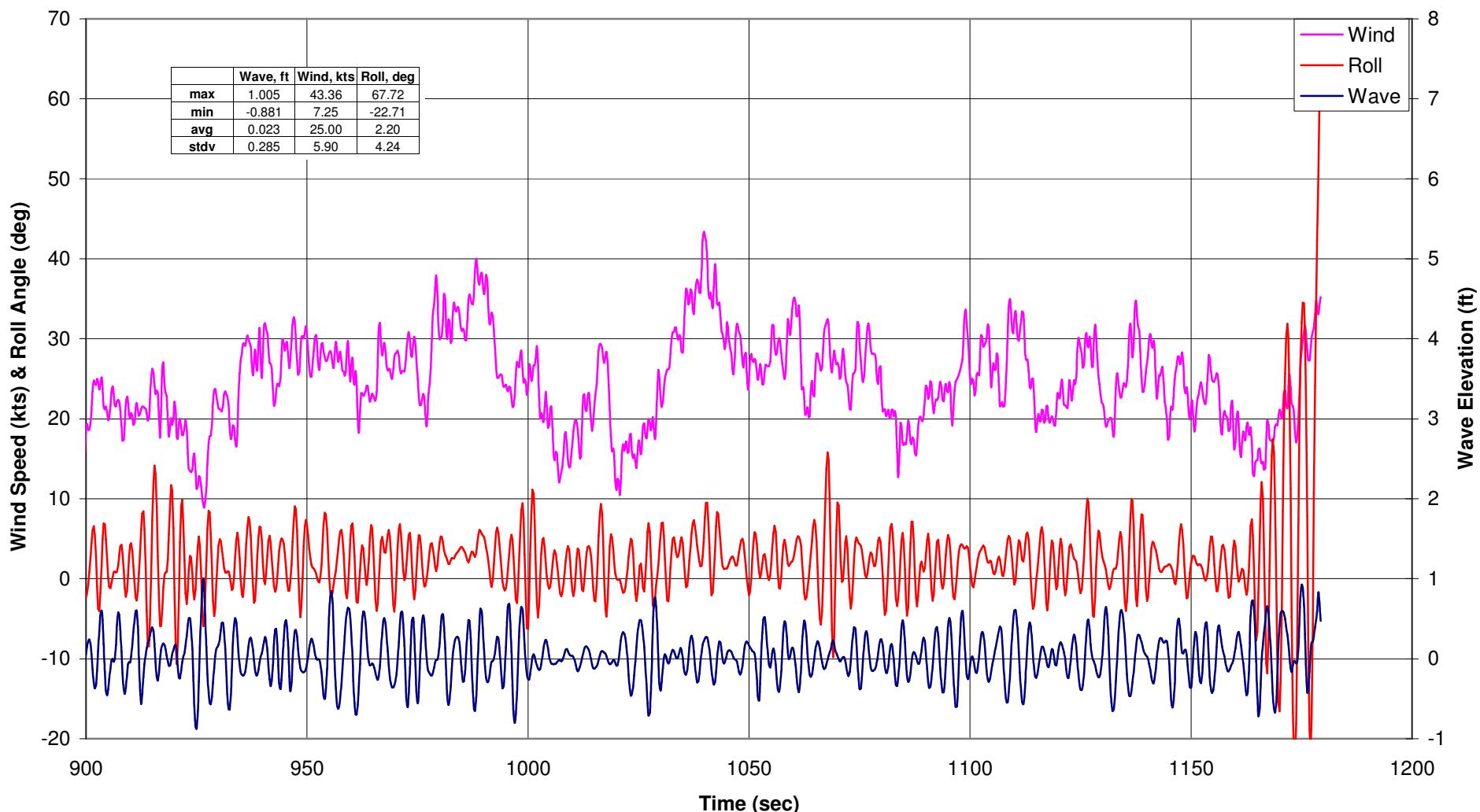
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27 August 2004

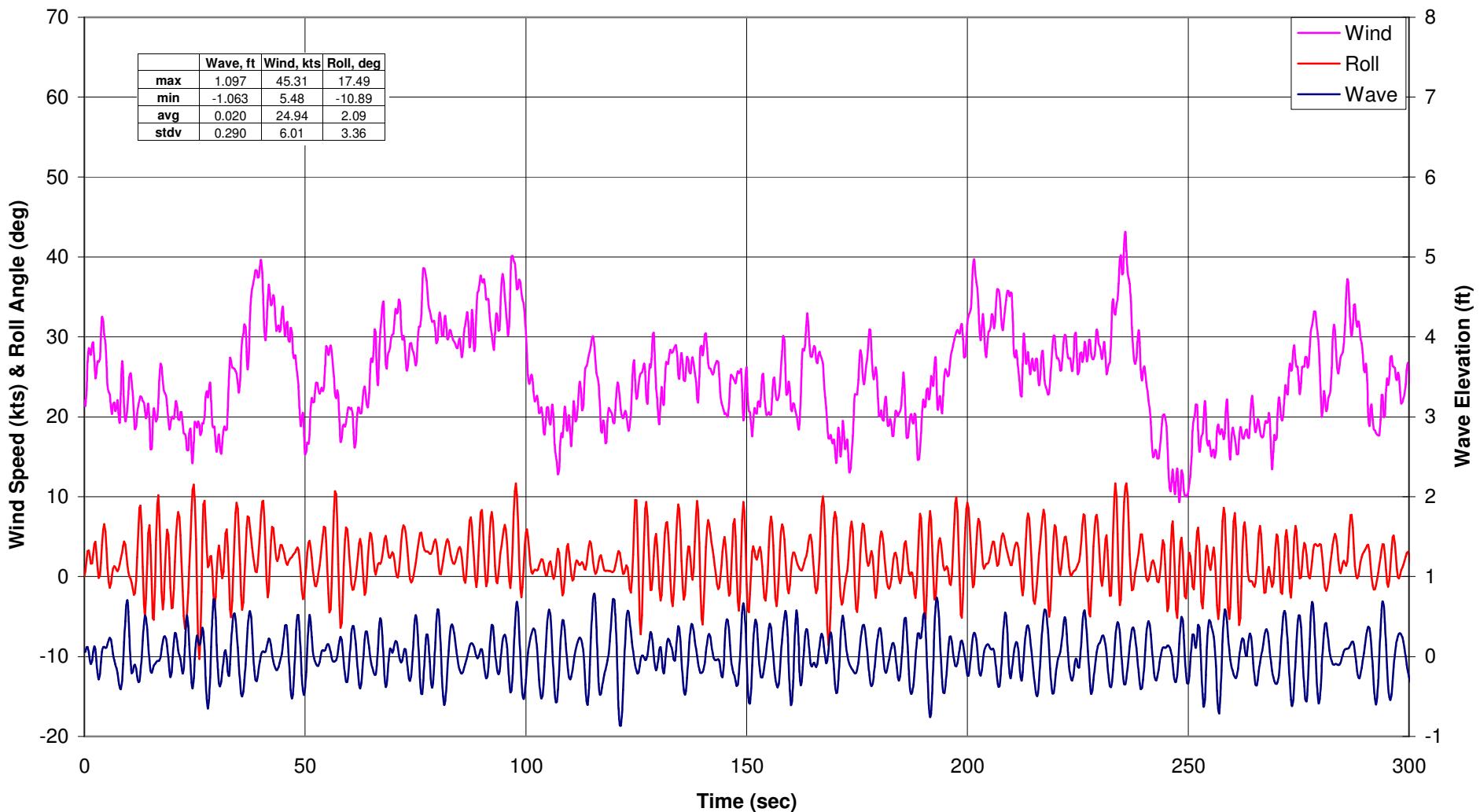
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Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

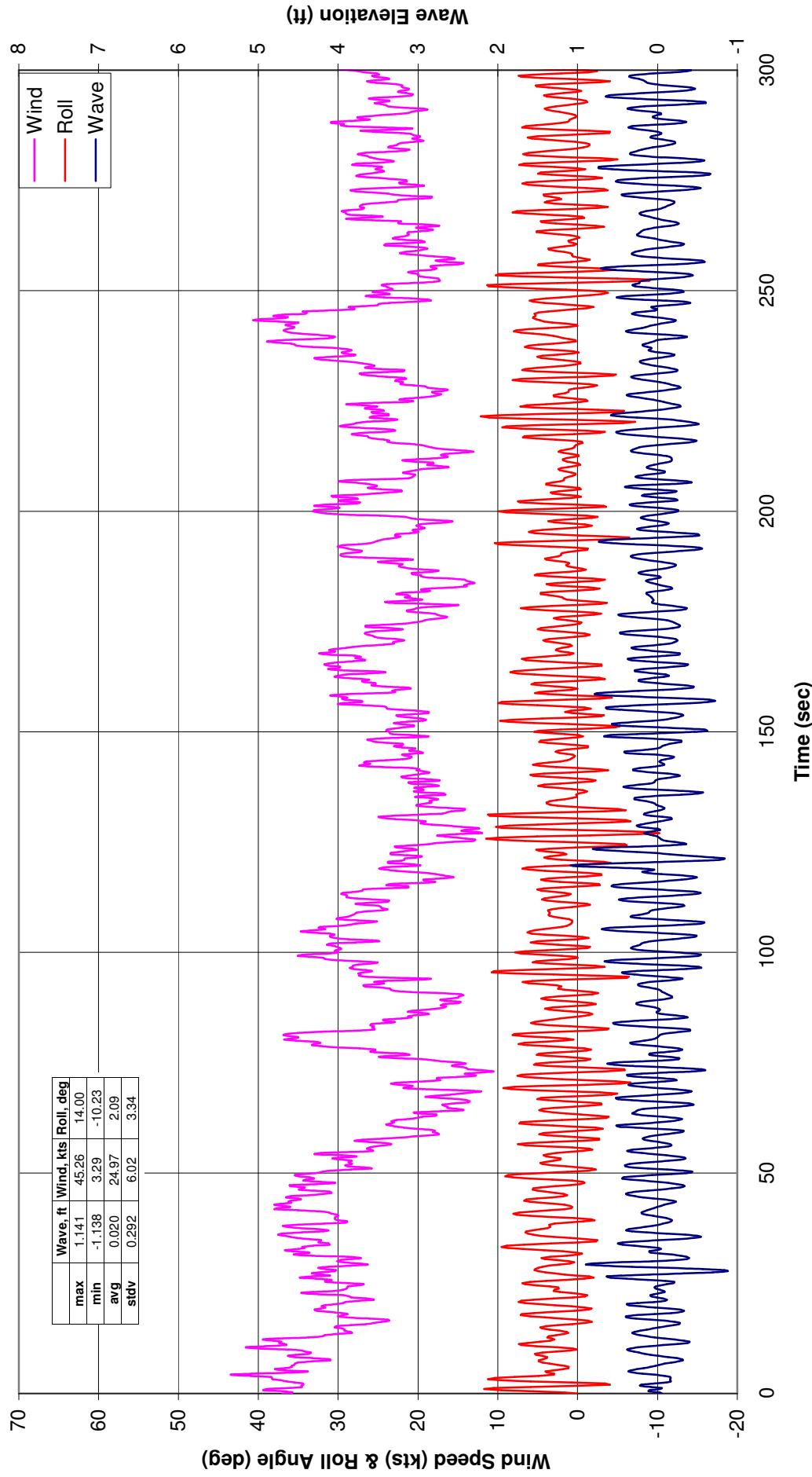
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27 August 2004

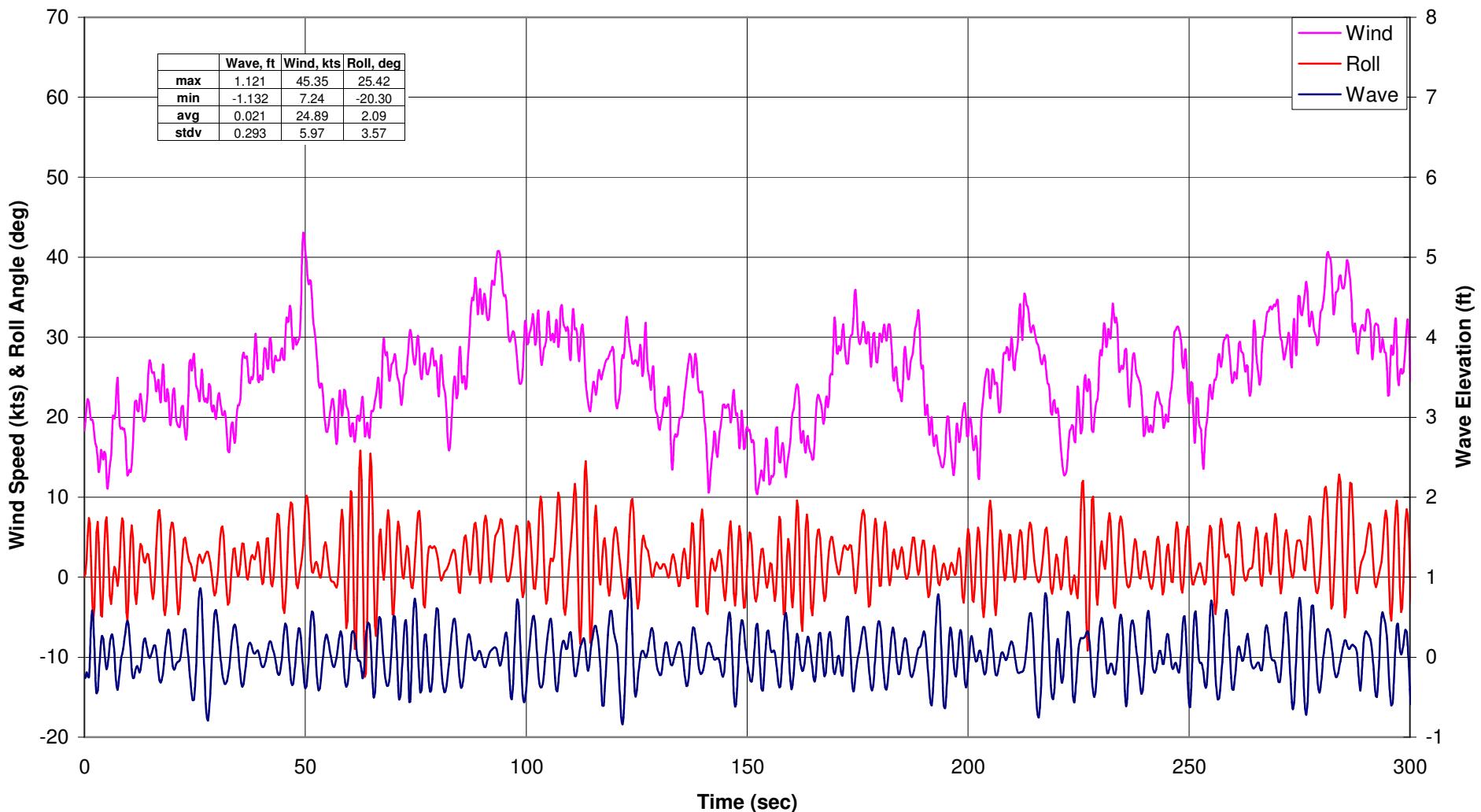
14 Passenger Case #16





Contract No. GS-23F-0068
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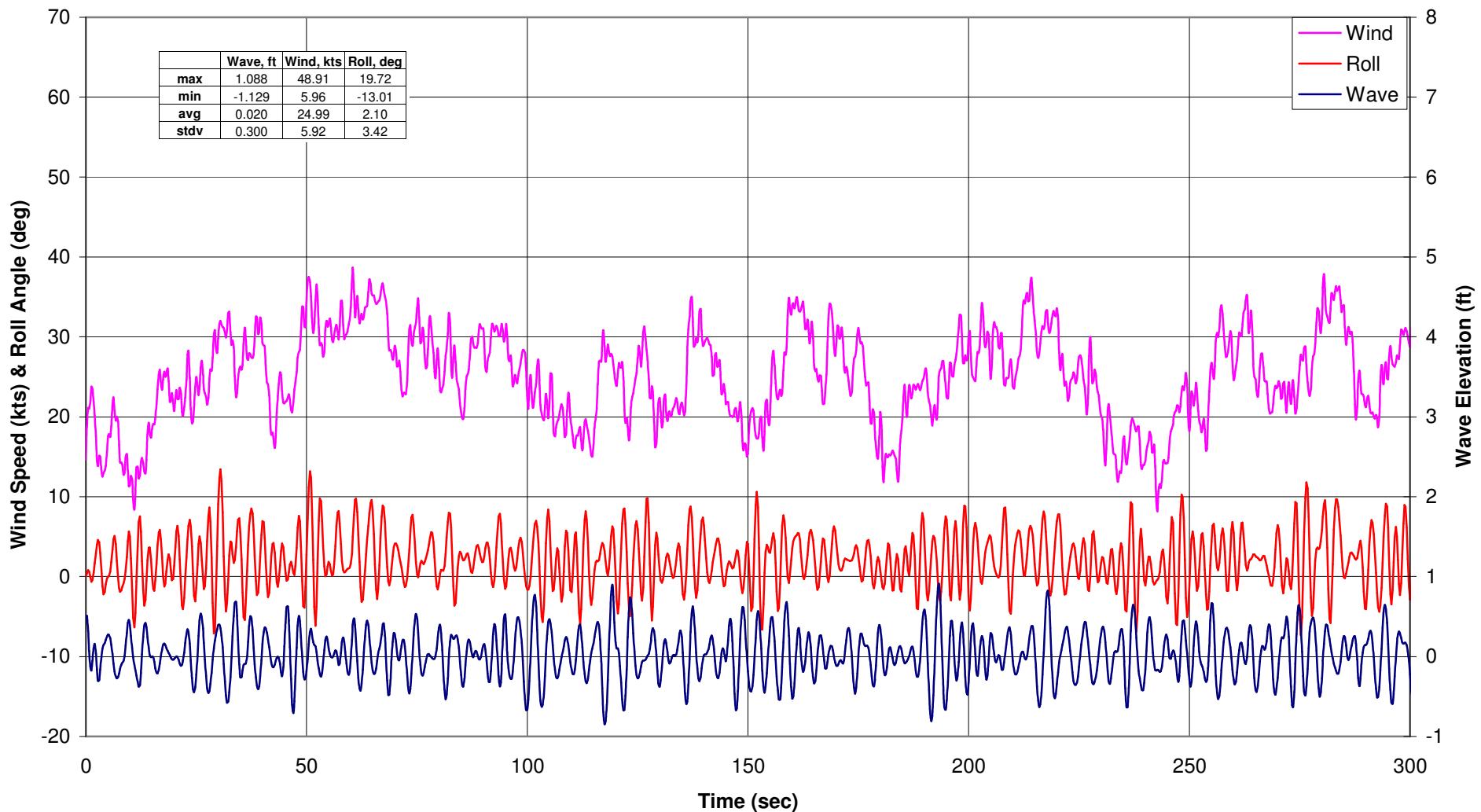
14 Passenger Case #17





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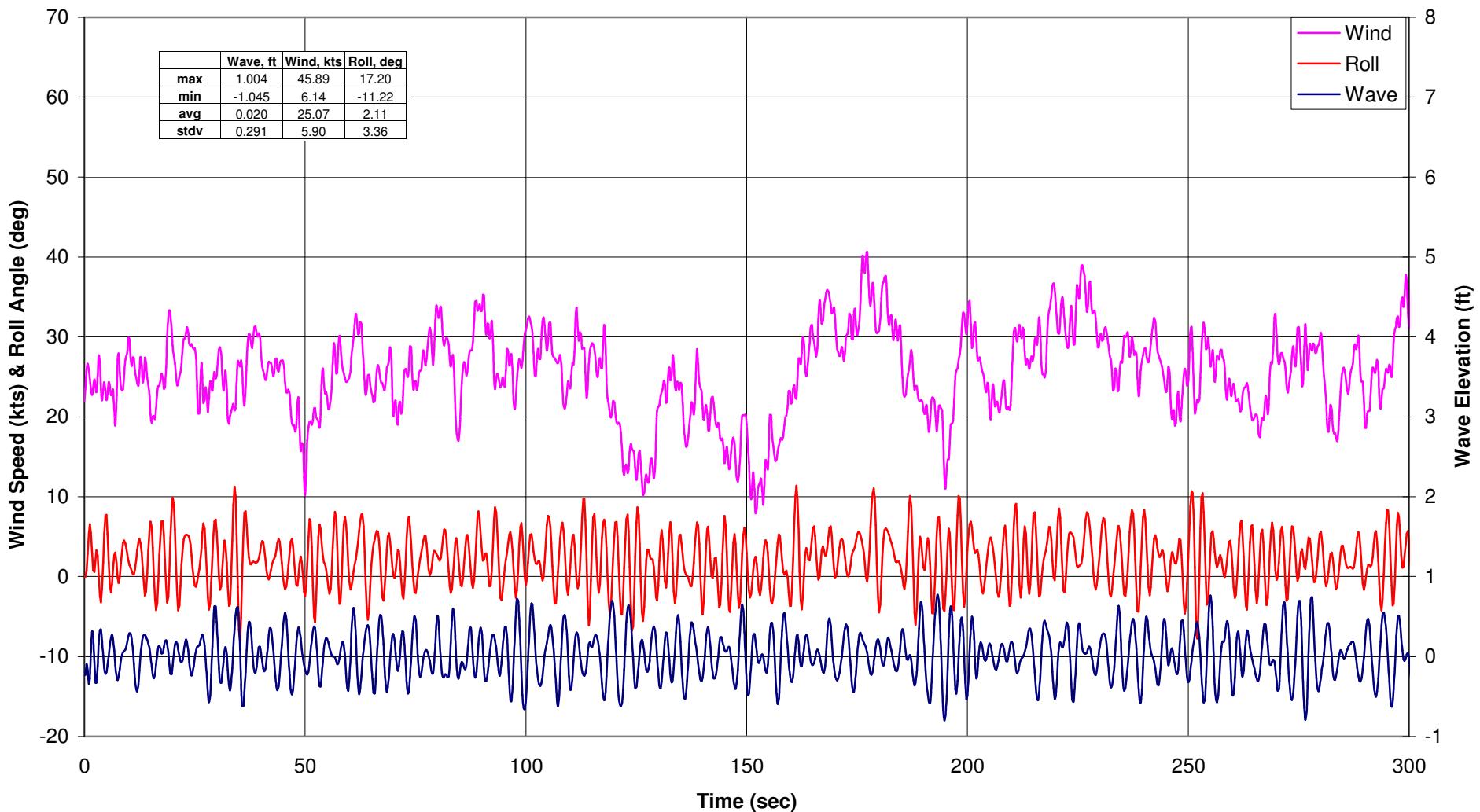
14 Passenger Case #18





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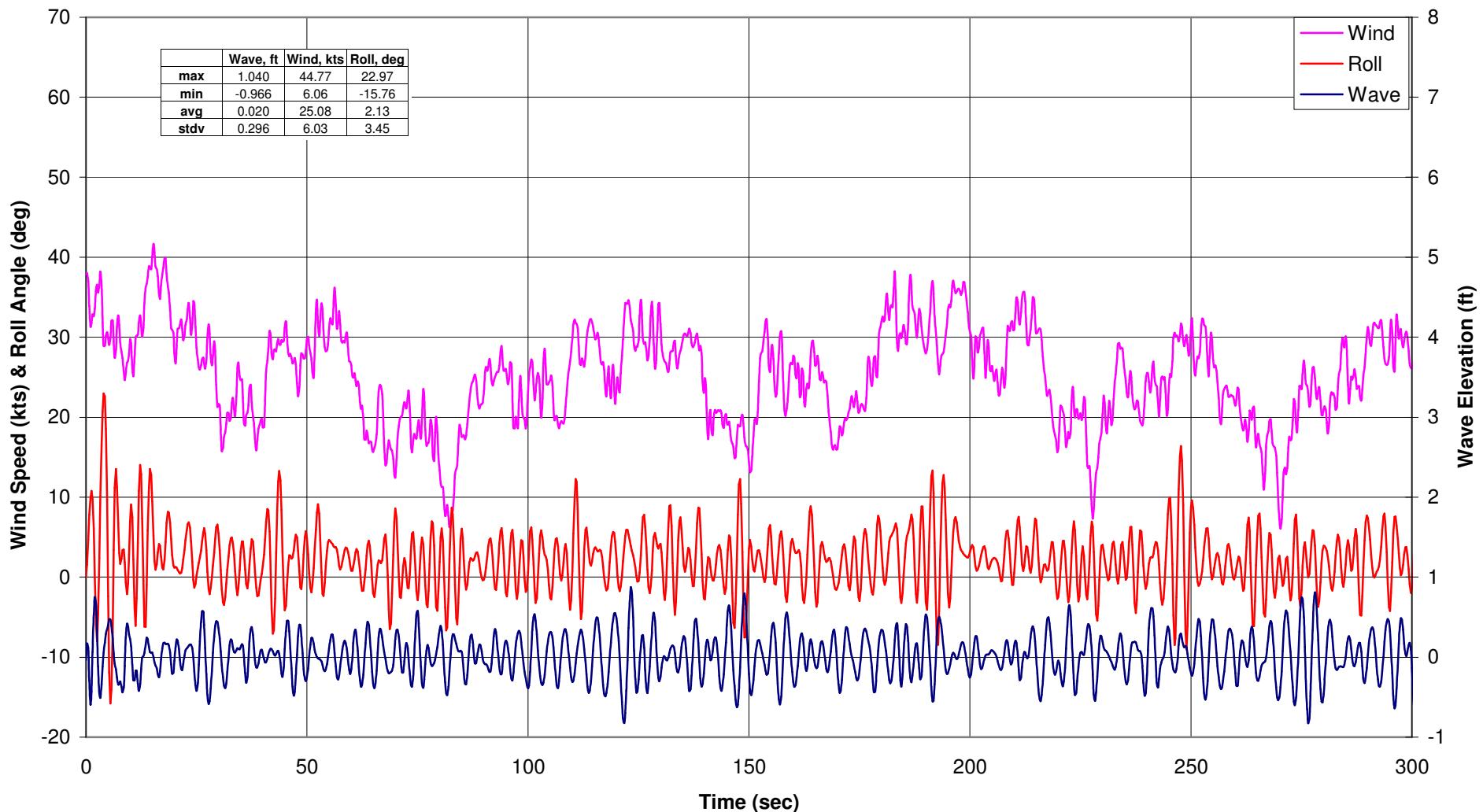
14 Passenger Case #19





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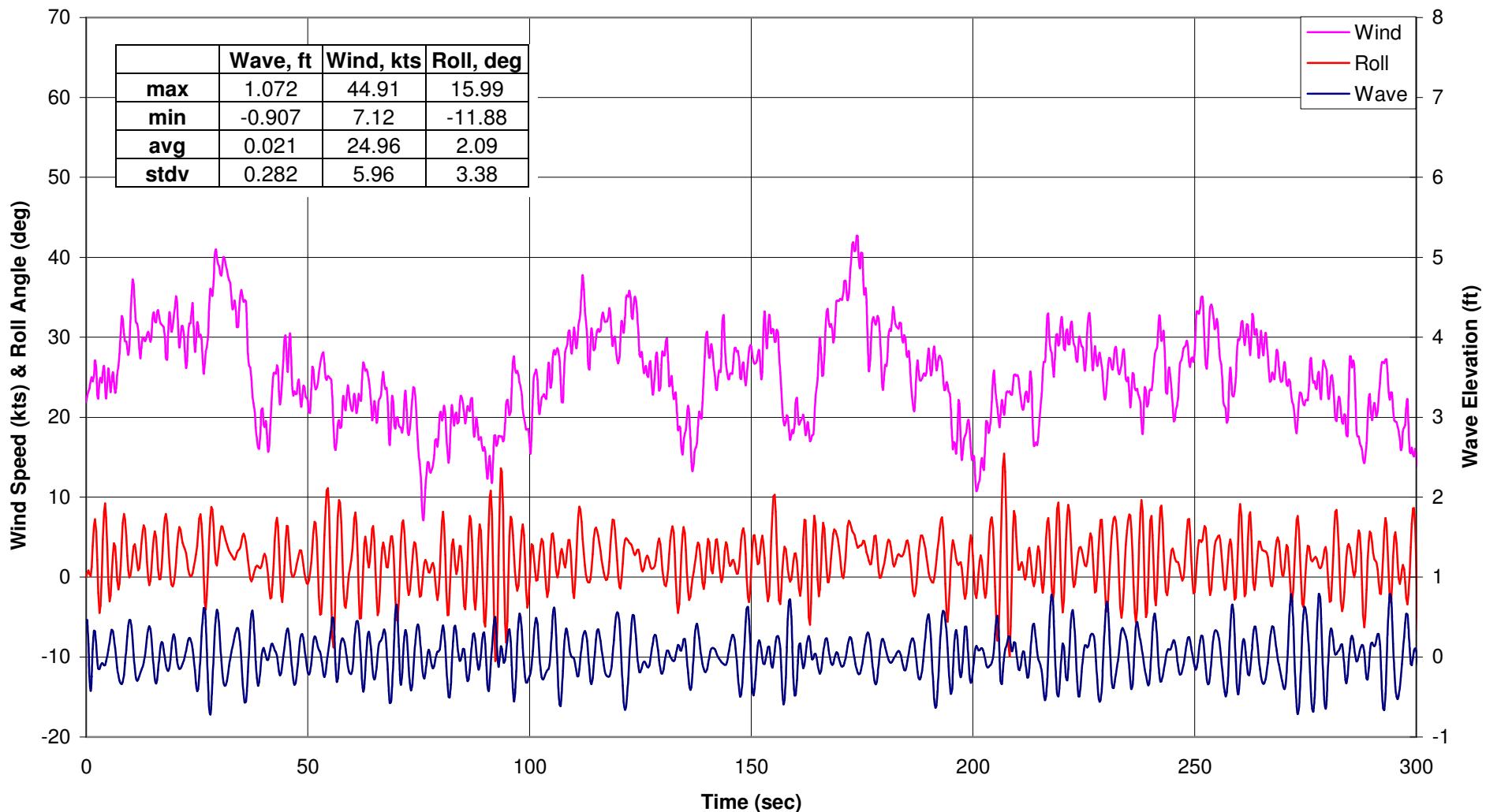
14 Passenger Case #20





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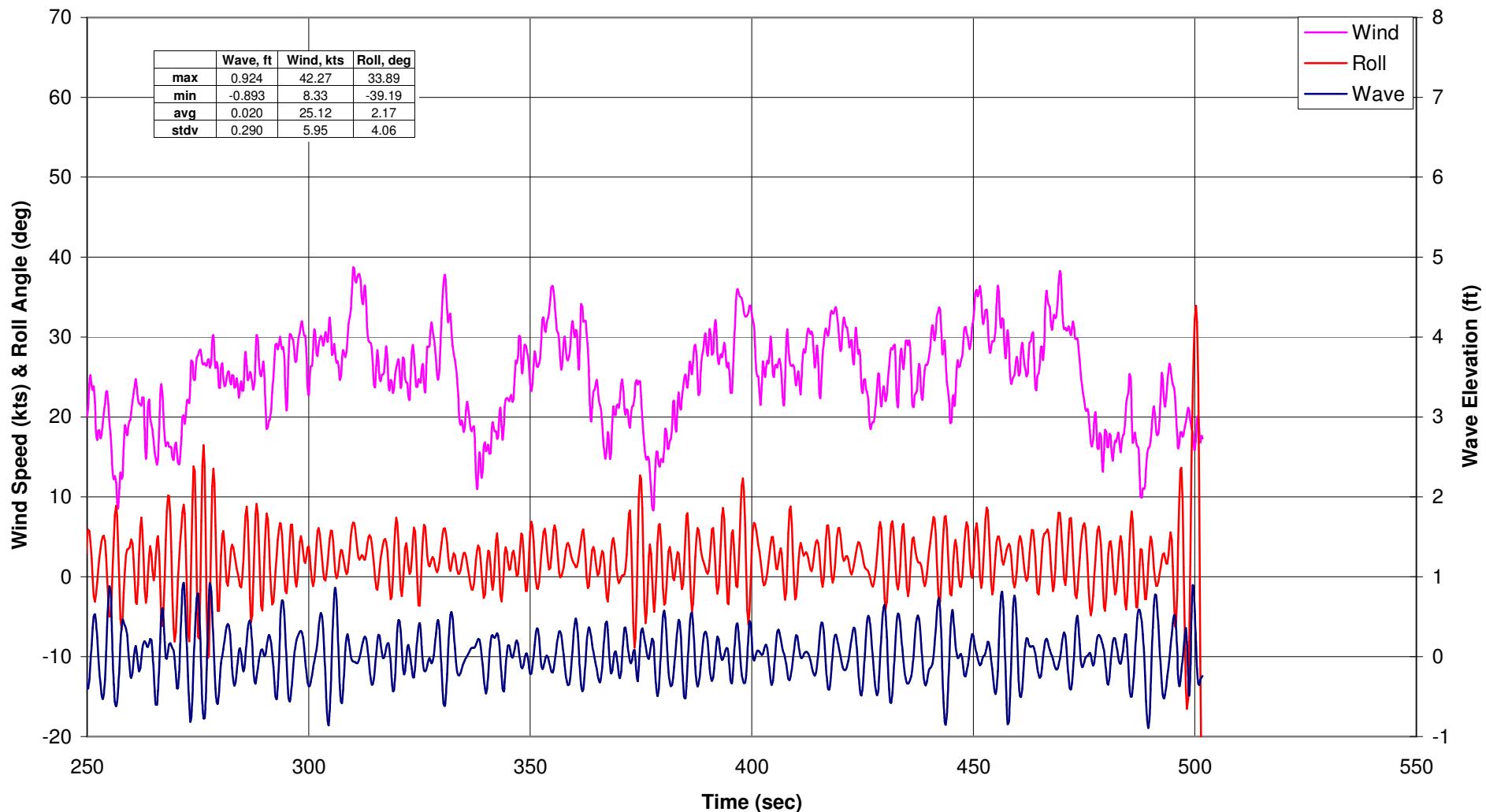
14 Passenger Case #21





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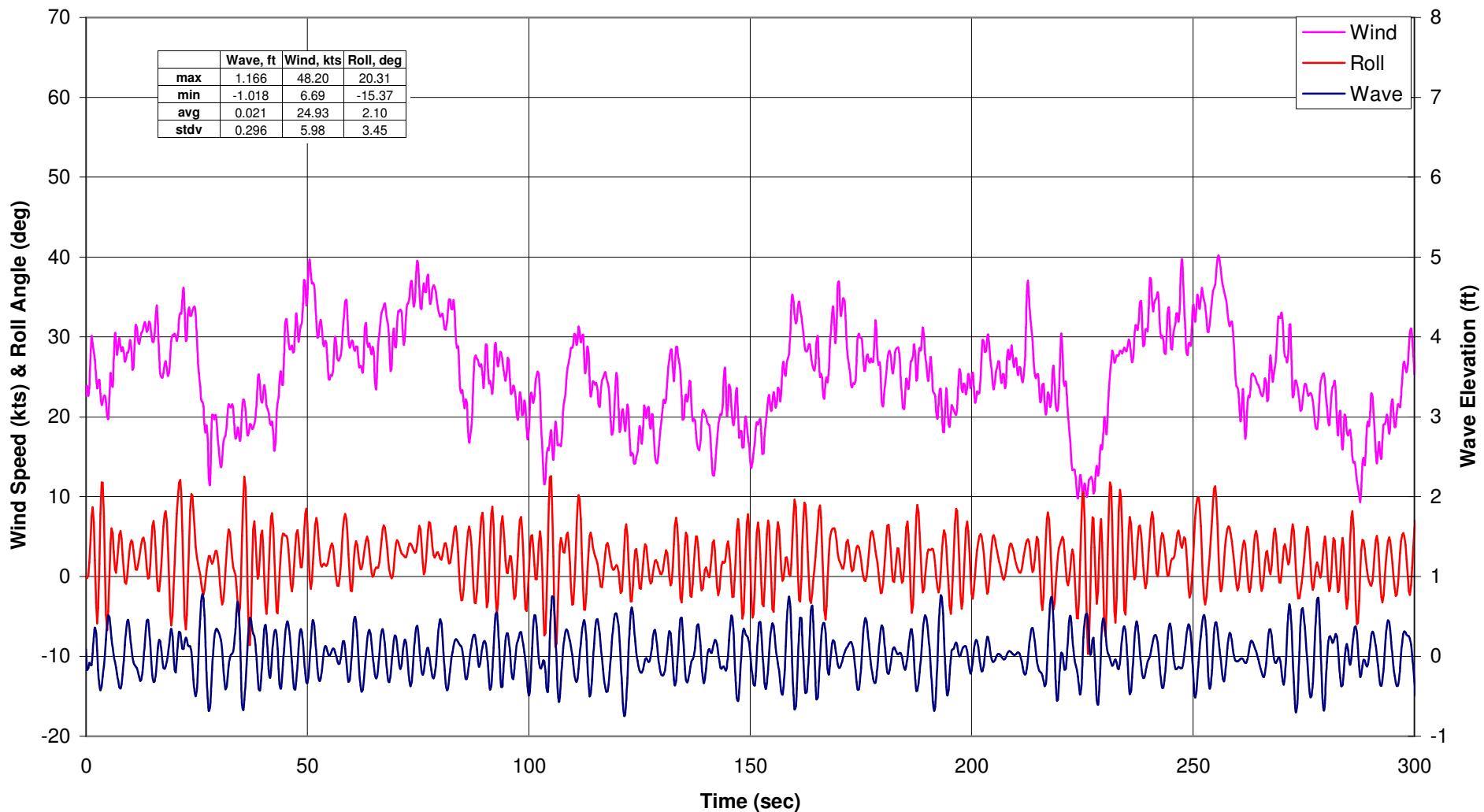
14 Passenger Case #22





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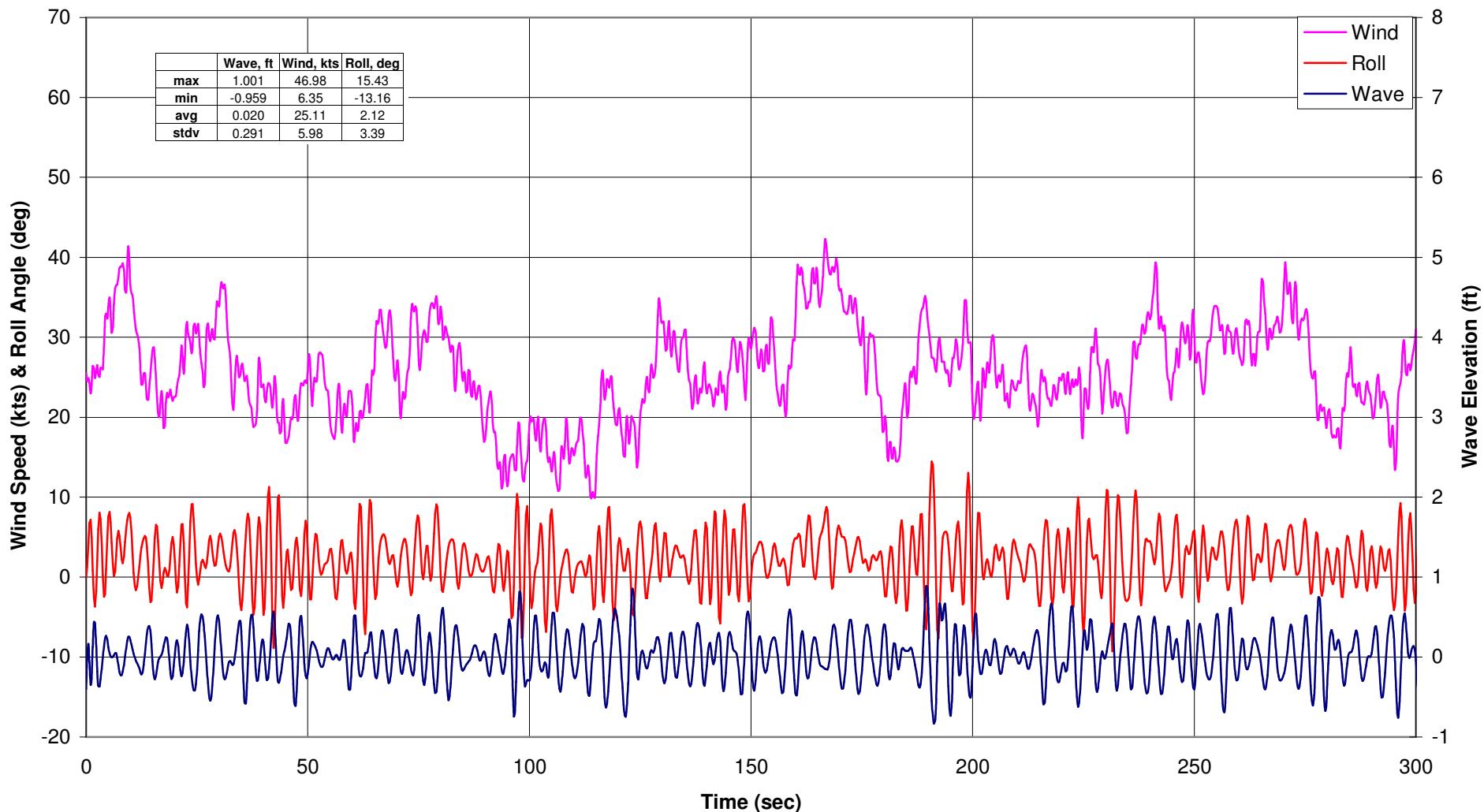
14 Passenger Case #23





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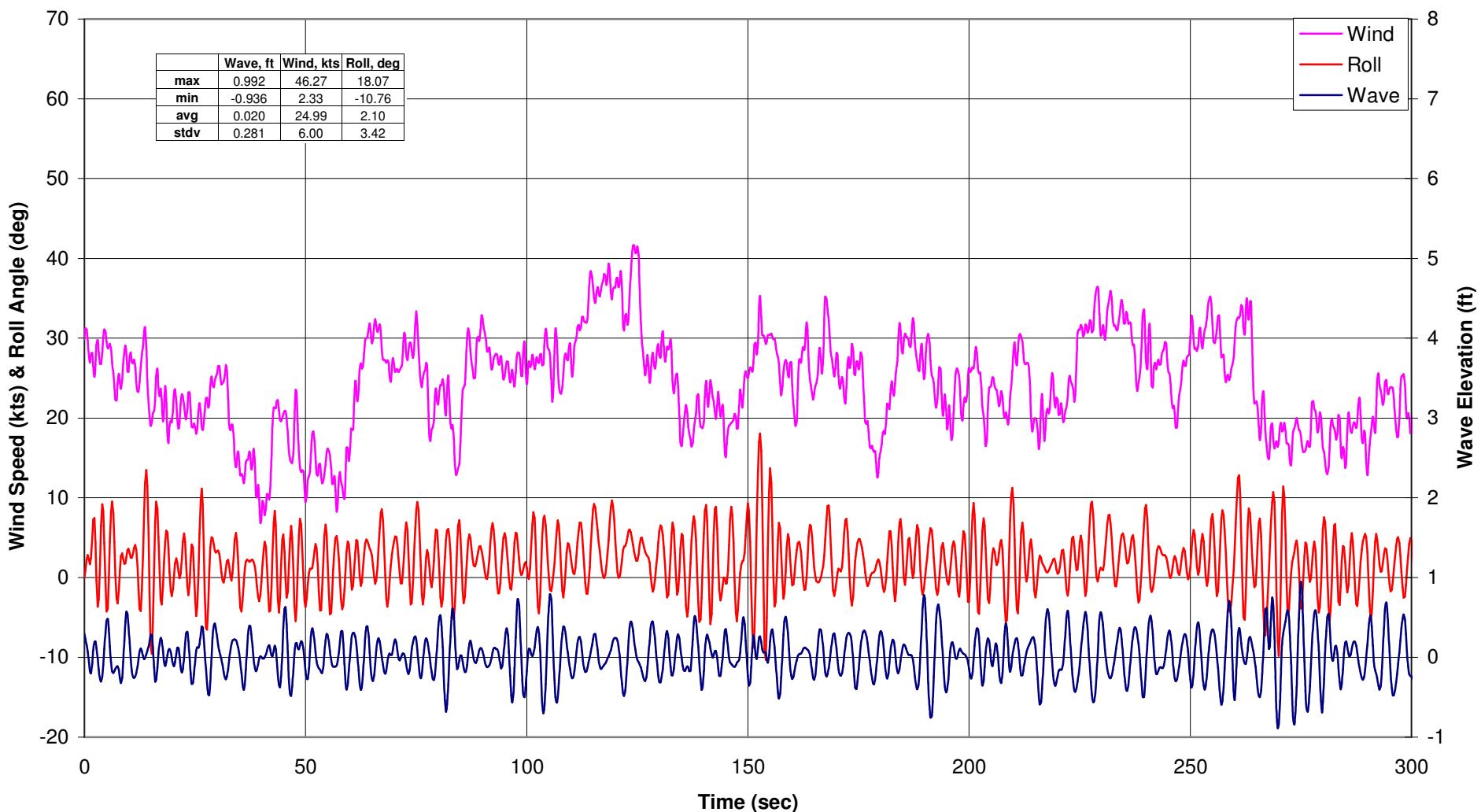
14 Passenger Case #24





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27 August 2004

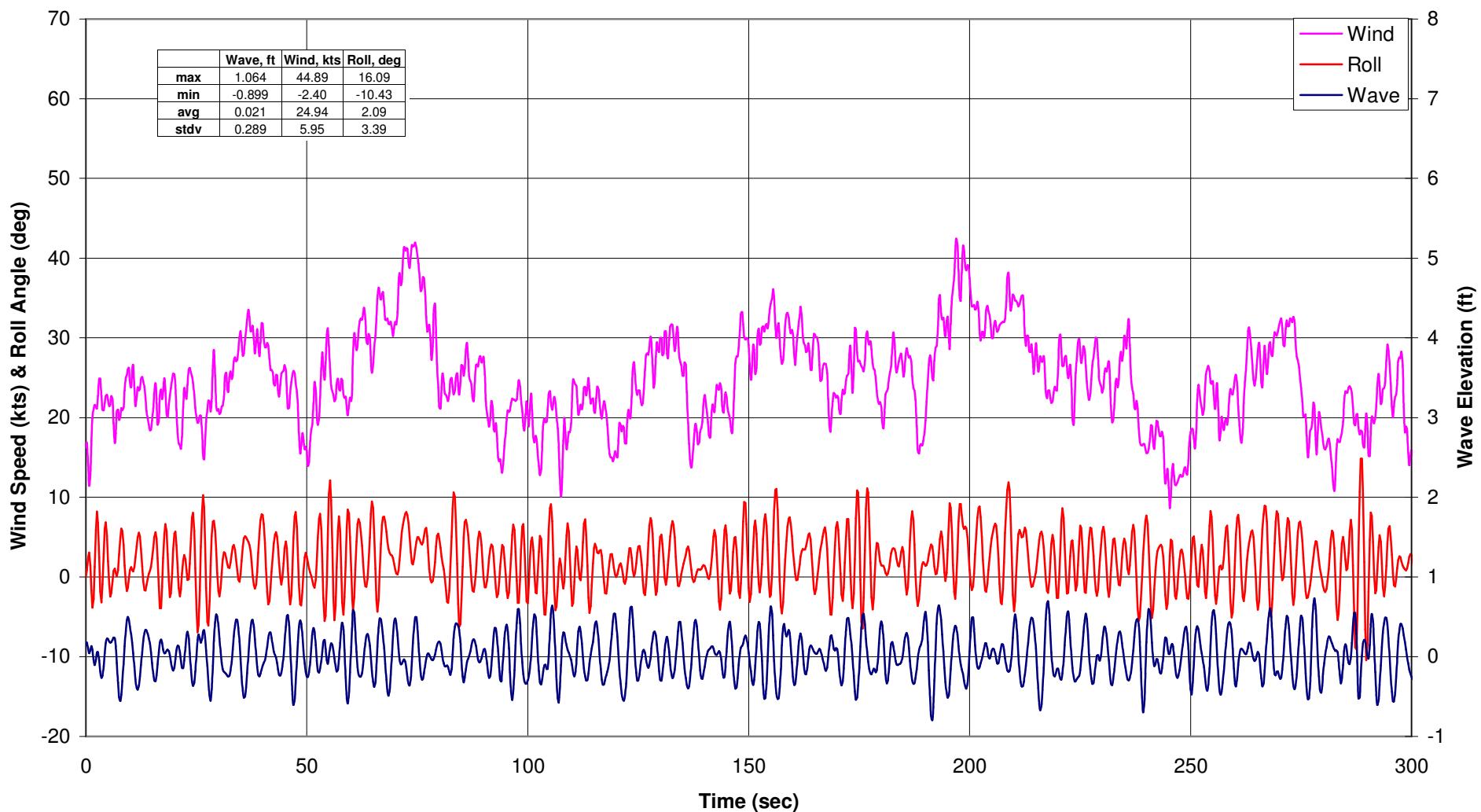
14 Passenger Case #25





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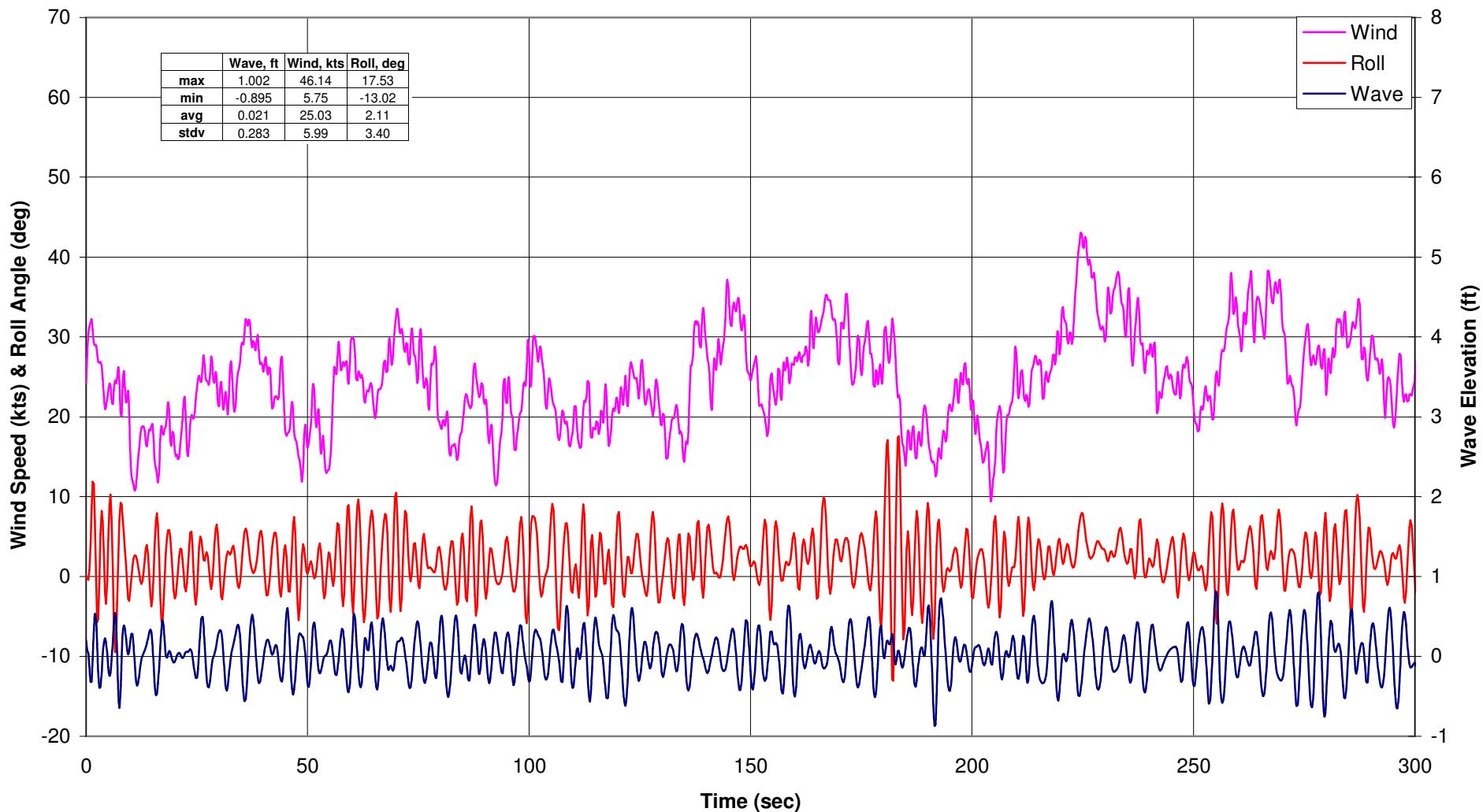
14 Passenger Case #26





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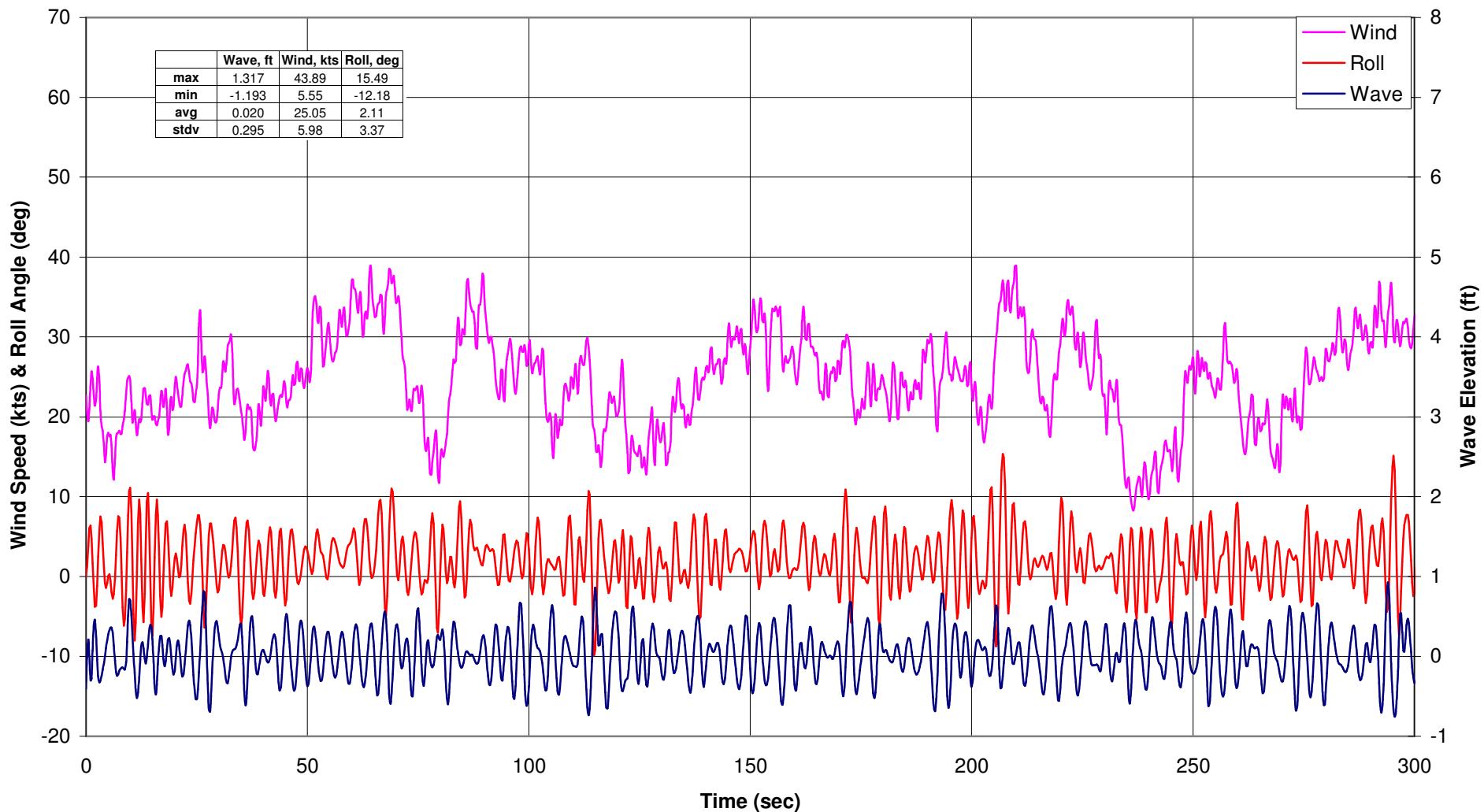
14 Passenger Case #27





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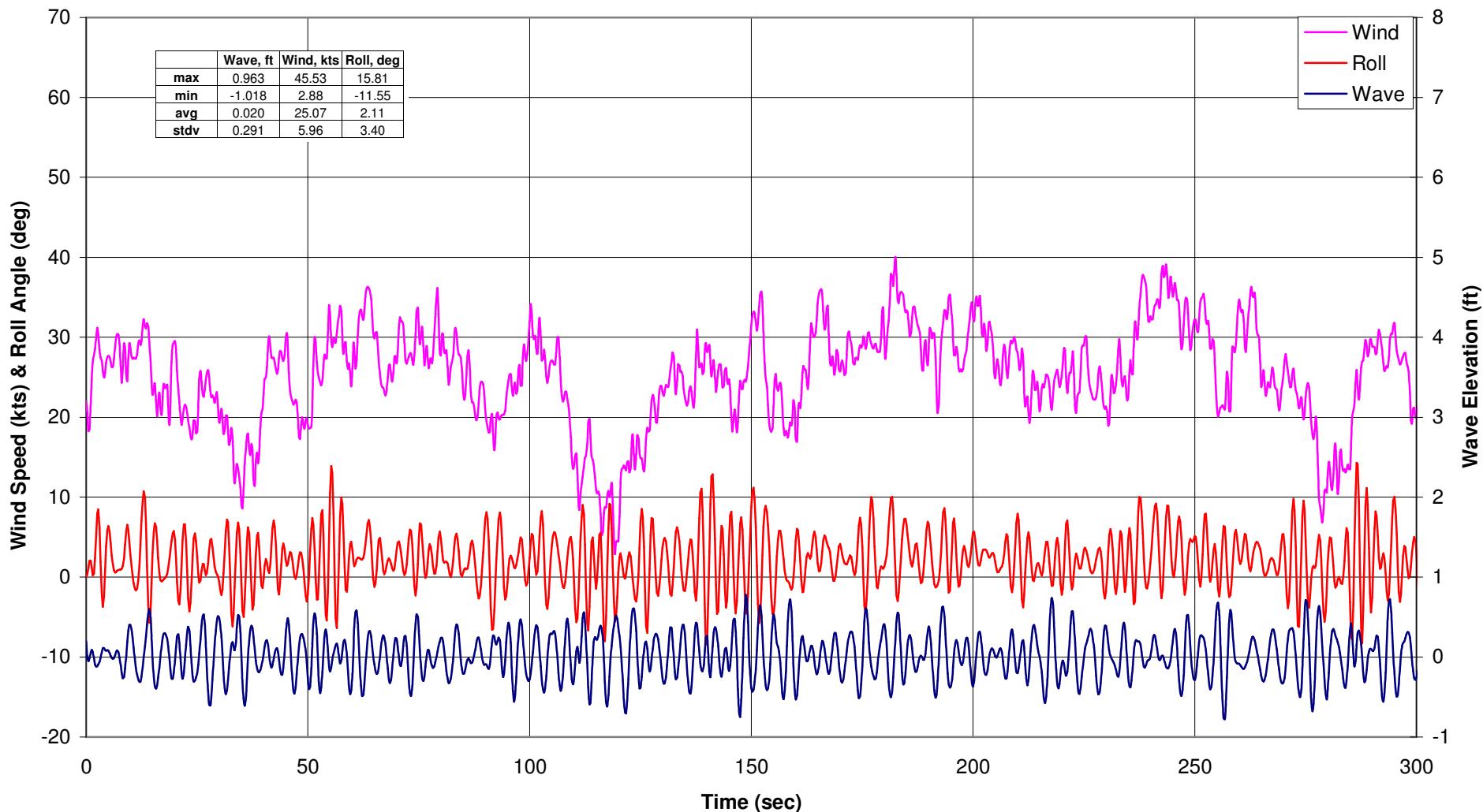
14 Passenger Case #28





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Order No. NTSBF040020
27 August 2004

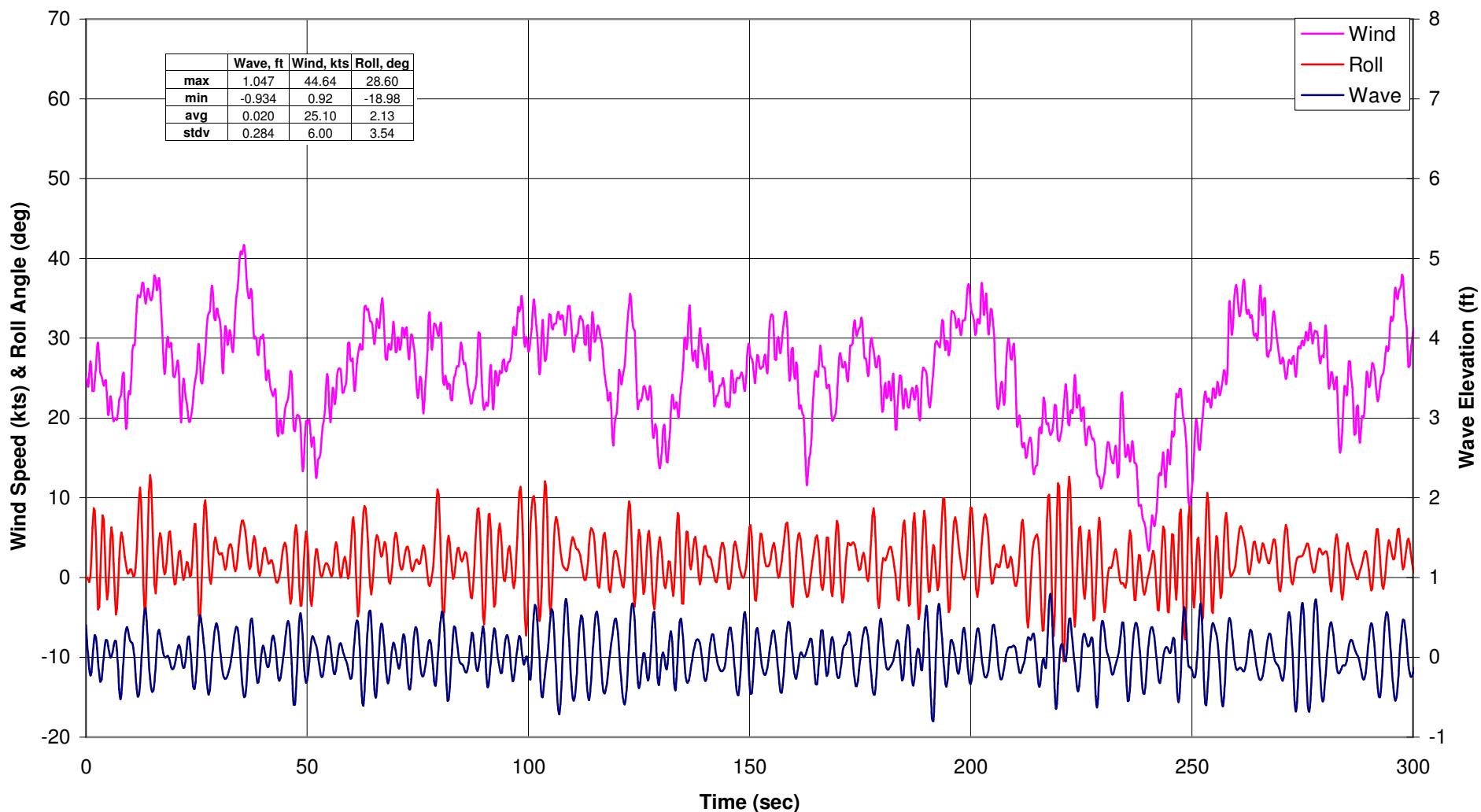
14 Passenger Case #29





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27 August 2004

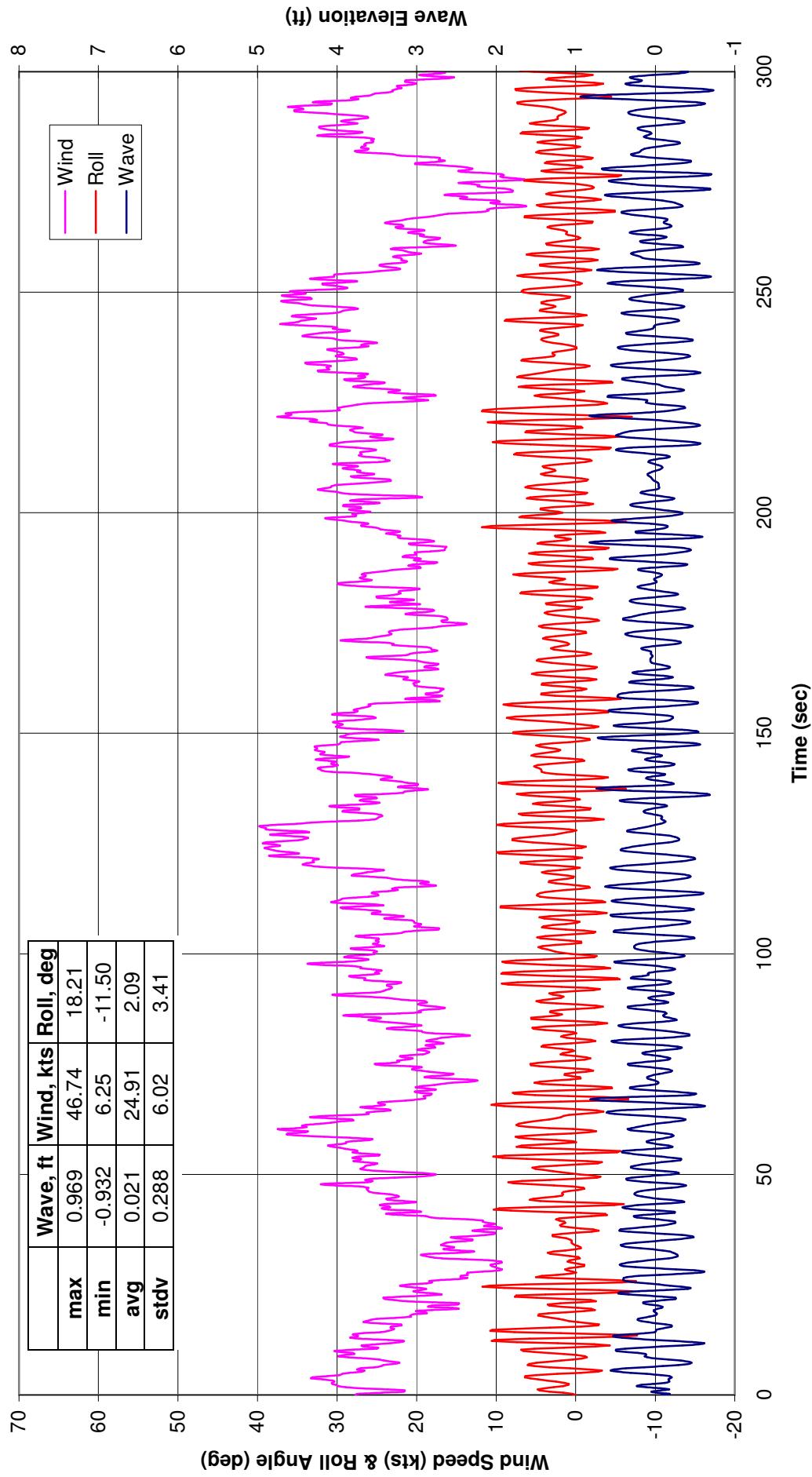
14 Passenger Case #30





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27 August 2004

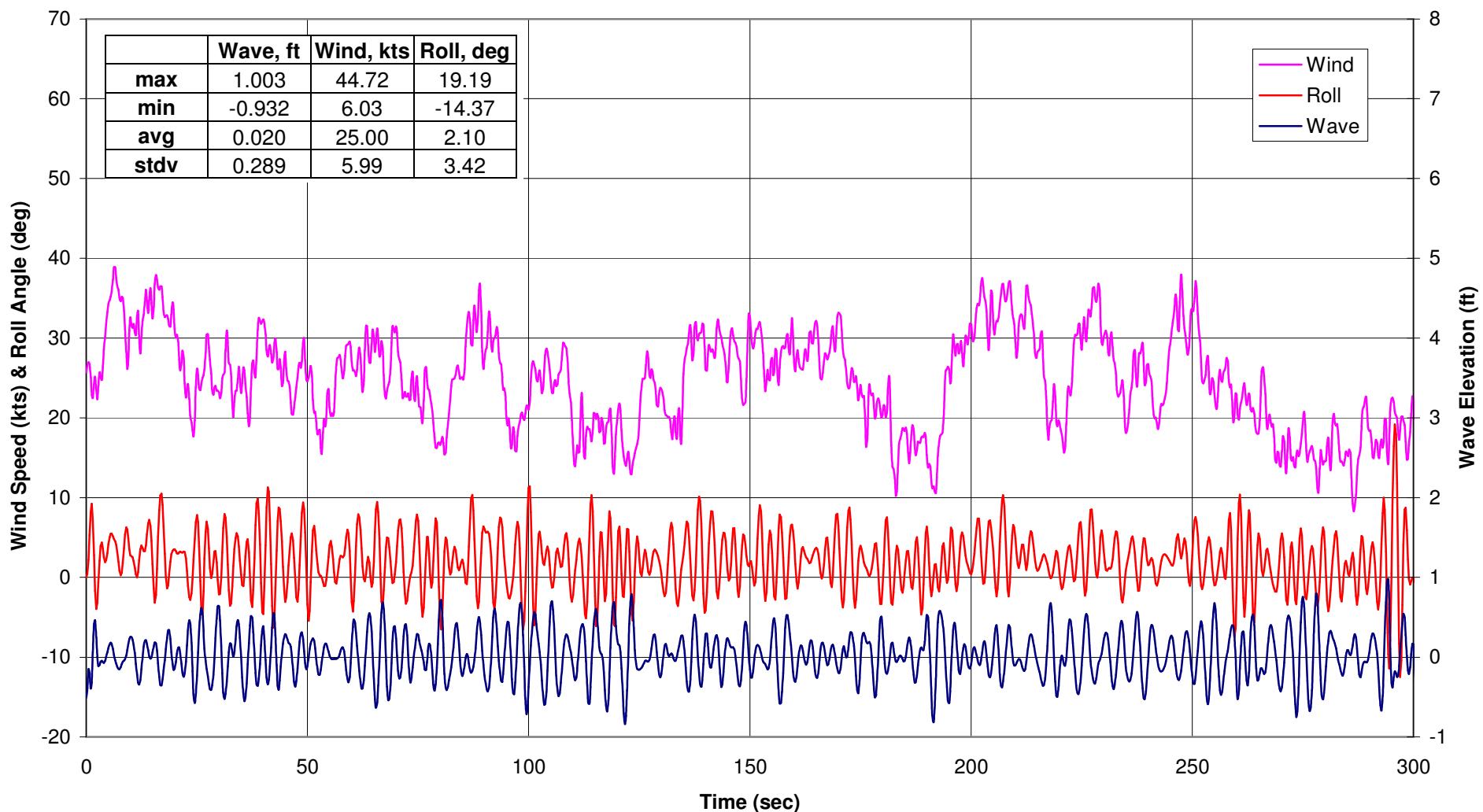
14 Passenger Case #31





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27 August 2004

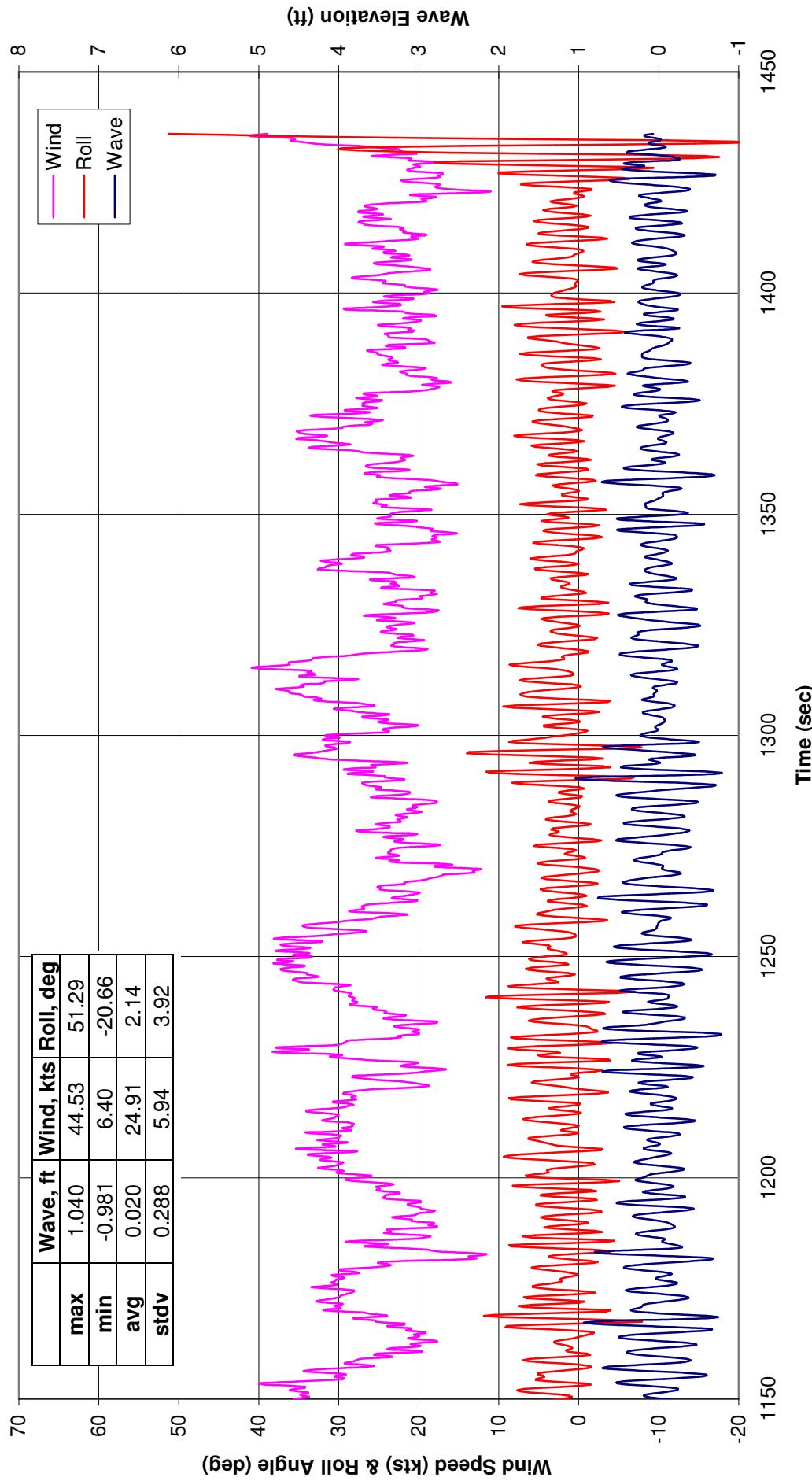
14 Passenger Case #32





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27 August 2004

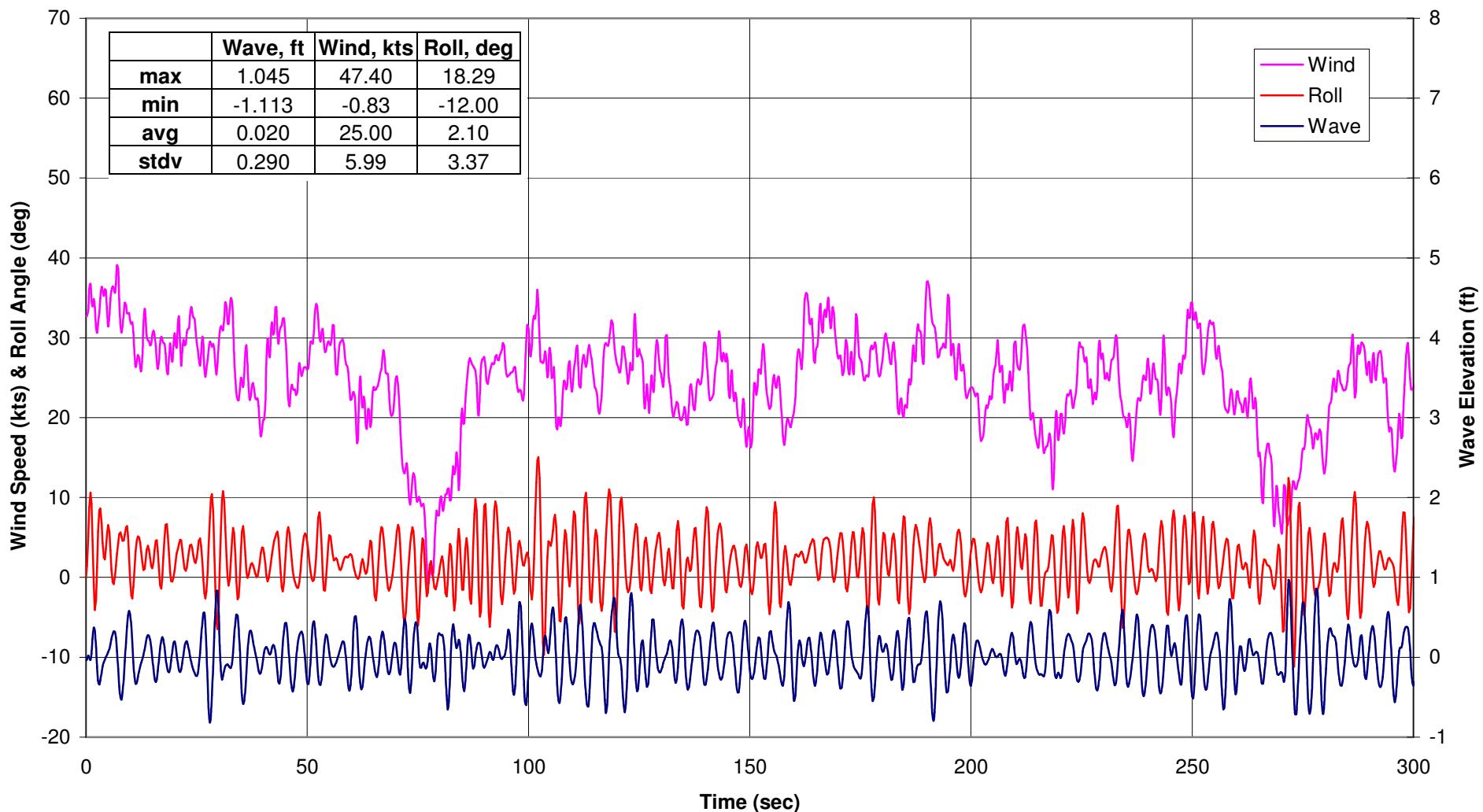
14 Passenger Case #33





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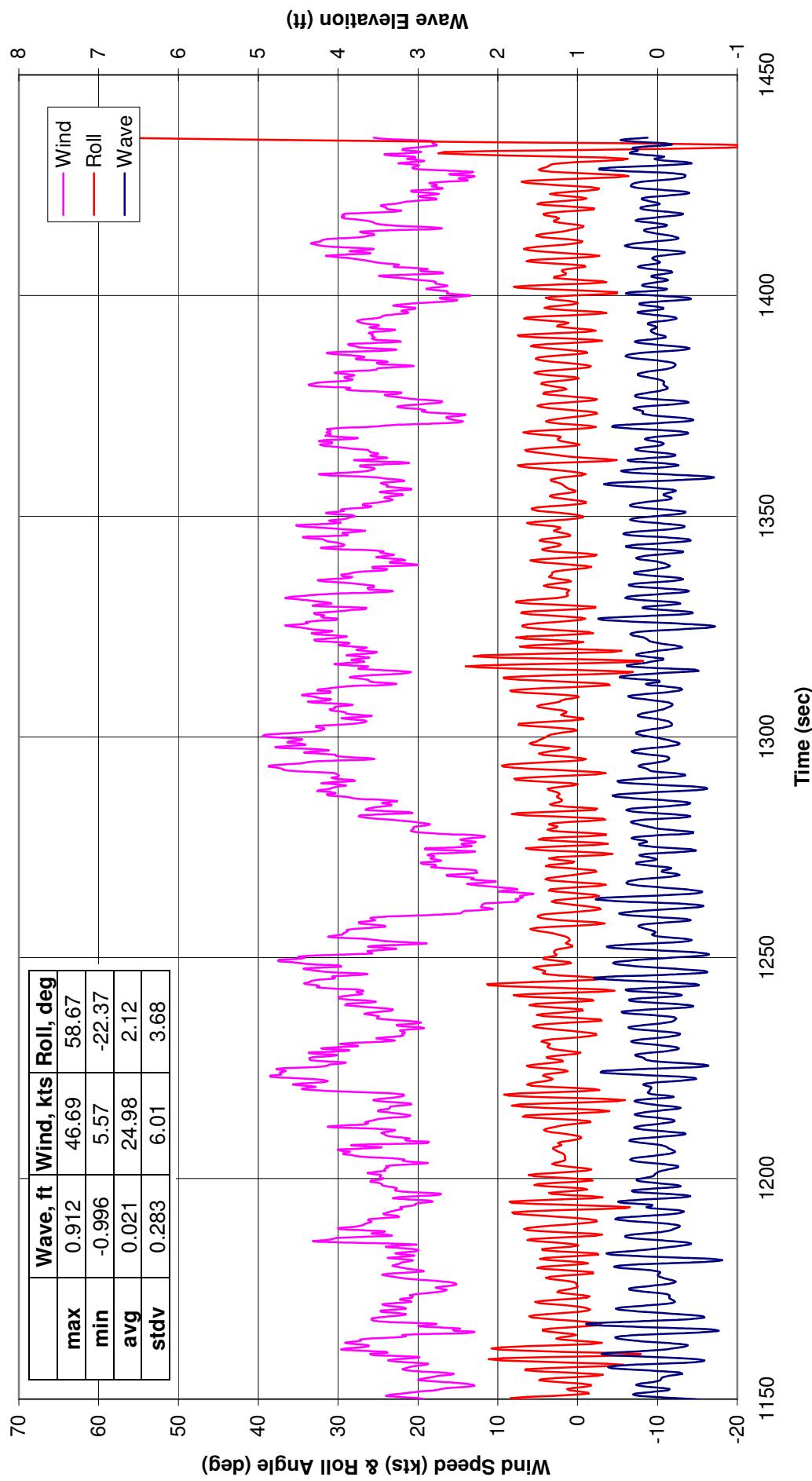
14 Passenger Case #34





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27 August 2004

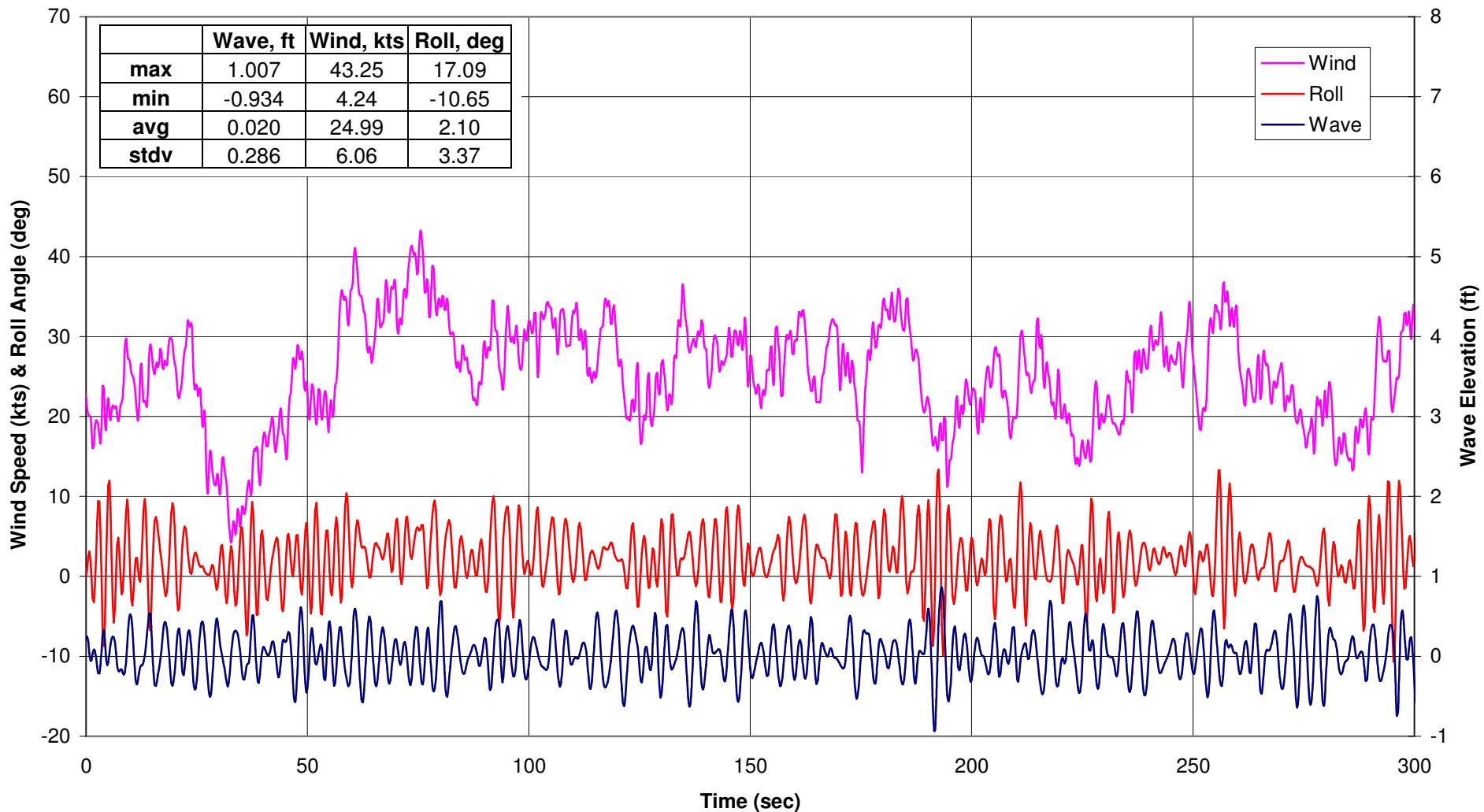
14 Passenger Case #35





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27 August 2004

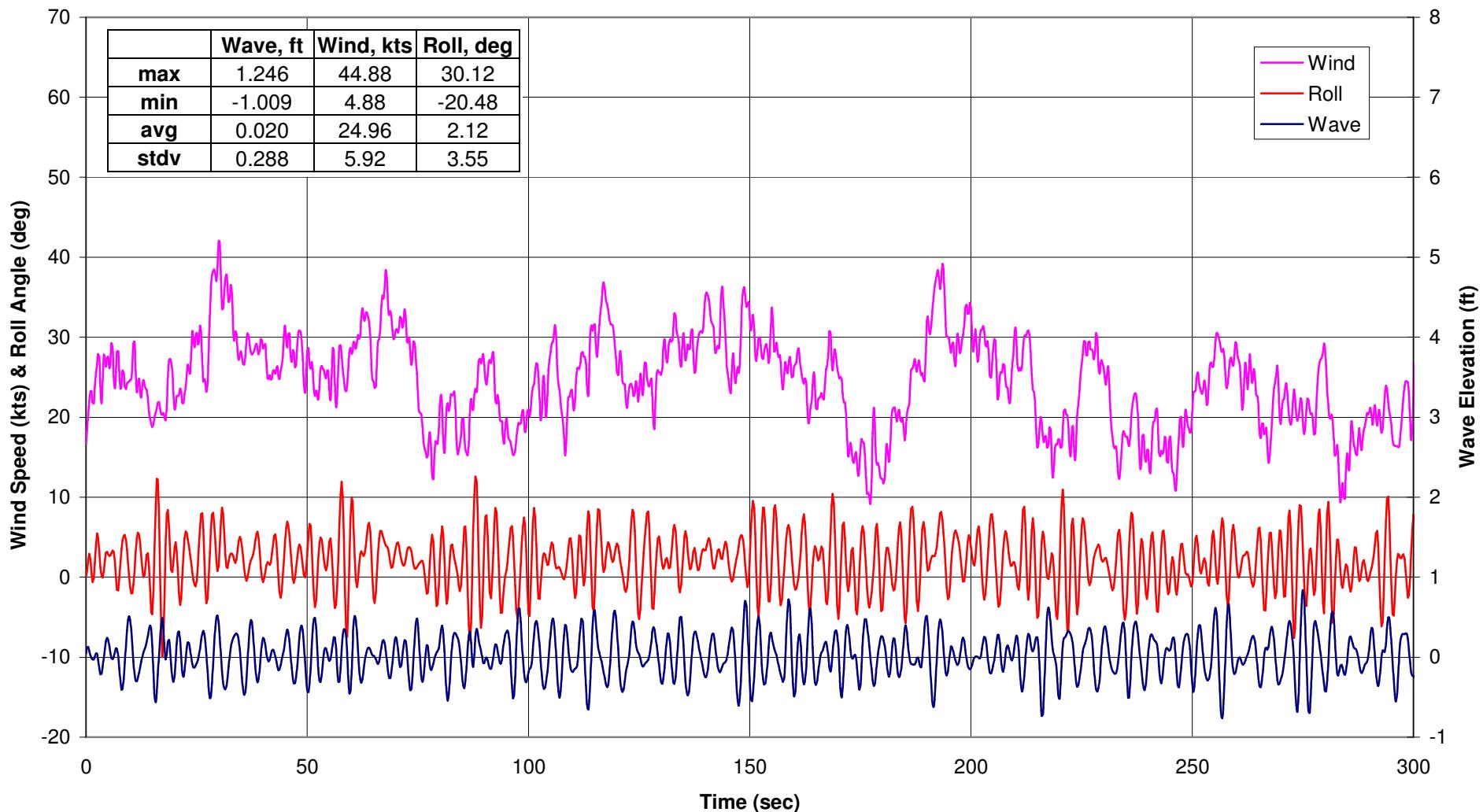
14 Passenger Case #36





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27 August 2004

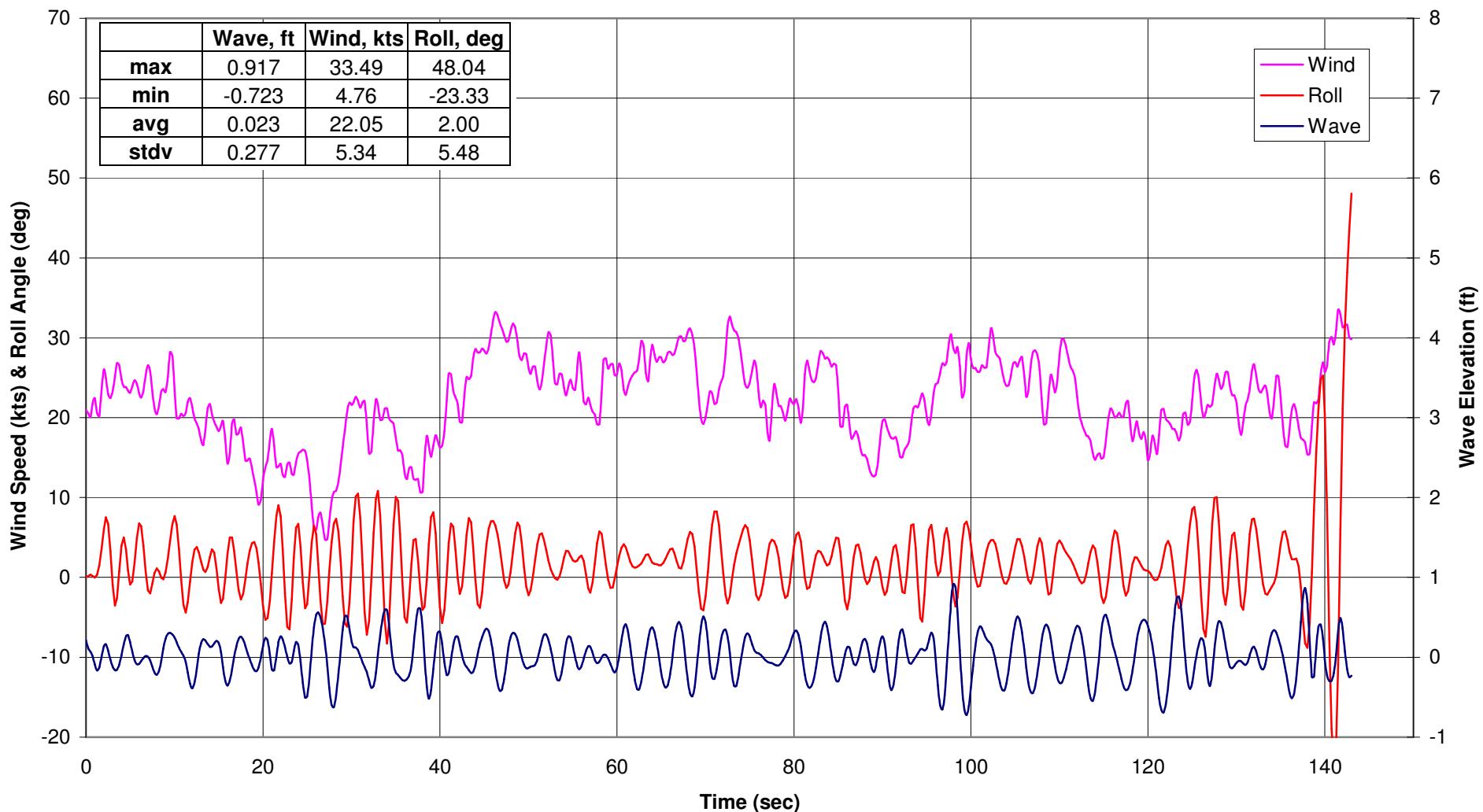
14 Passenger Case #37





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Order No. NTSBF040020
27 August 2004

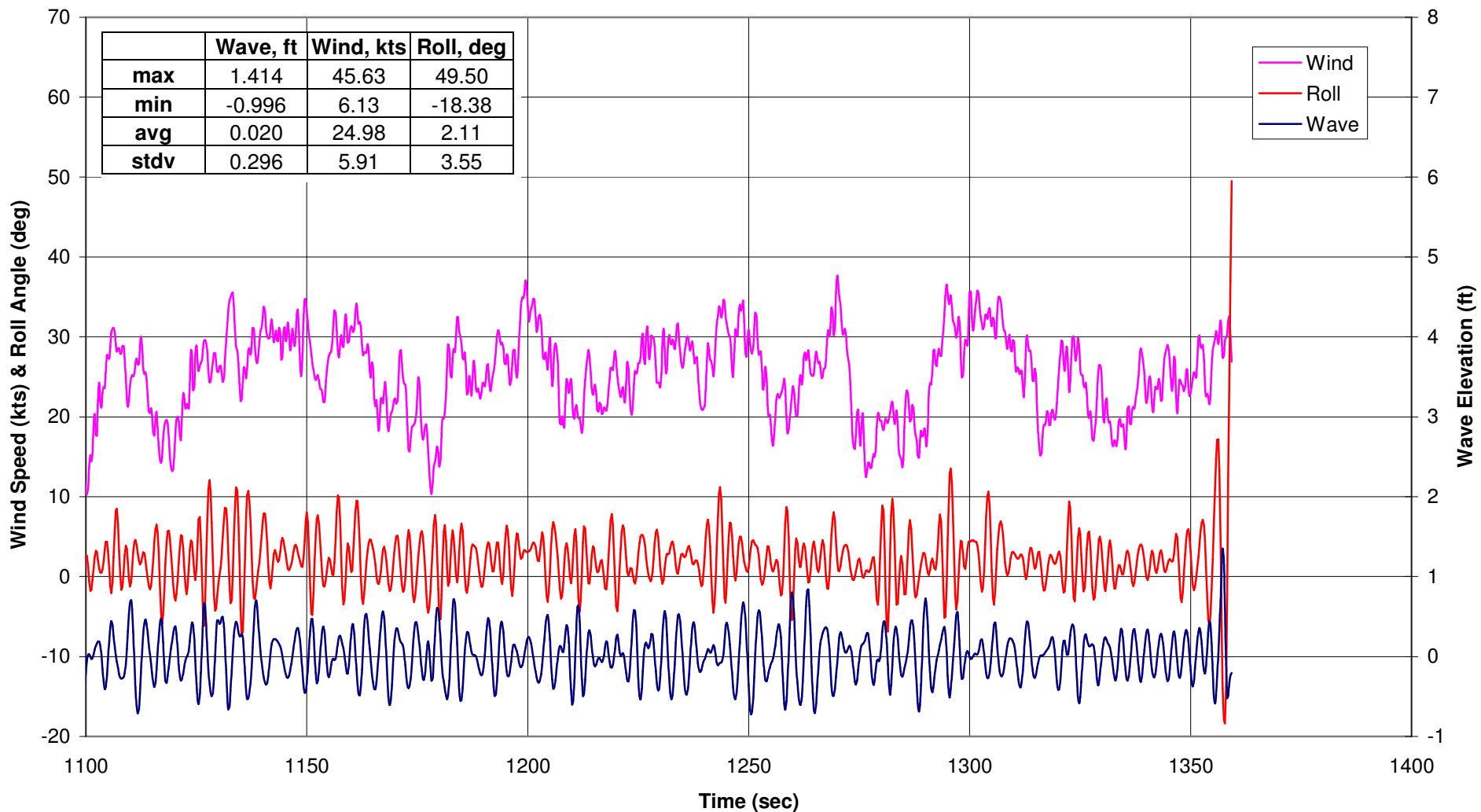
14 Passenger Case #38





Contract No. GS-23F-0068
Order No. NTSBF040020
27 August 2004

14 Passenger Case #39





Contract No. GS-23F-0068
Order No. NTSBF040020
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14 Passenger Case #40

